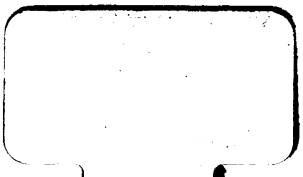

THE

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COMPRISING TEN VOLUMES ON THE YEAR'S PROGRESS IN MEDICINE AND SURGERY

UNDER THE GENERAL EDITORIAL CHARGE OF

CHARLES L. MIX, A. M., M. D.

PROFESSOR OF PHYSICAL DIAGNOSIS IN THE NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

VOLUME X

NERVOUS AND MENTAL DISEASES

EDITED BY

HUGH T. PATRICK, M. D.

PROFESSOR OF NEUROLOGY IN THE CHICAGO POLICLINIC, CLINICAL PROFESSOR OF NERVOUS DISEASES IN THE NORTHWESTERN UNIVERSITY MEDICAL SCHOOL; EX-PRESIDENT CHICAGO NEUROLOGICAL SOCIETY.

LEWIS J. POLLOCK, M. D.

INSTRUCTOR IN NERVOUS AND MENTAL DISEASES, NORTHWESTERN UNIVERSITY MEDICAL SCHOOL.

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DISEASES OF THE NERVOUS SYSTEM.

SYMPTOMATOLOGY.

Coördinated Reflexes. Böhme[1] describes the case of a boy with complete paralysis of the left leg and also of the right except that it could be flexed a very little at the hip. Likewise, there was paralysis of the rectal and vesical sphincters. The condition had existed for five years. The tendon reflexes were exaggerated; occasionally there were involuntary movements of the legs. On stroking the sole the hip and knee became flexed with dorsal flexion of the foot and toes, and this same coördinated reflex was obtained when the skin of the leg and of the lower abdomen was irritated. A strong stimulus caused flexion, a weak stimulus extension. The extension reflex is tonic, the limb remaining in the extended position even when it has been passively induced. The other leg became slightly flexed as the one leg became extended, and *vice versa*. When the flexion reflex is induced in one leg by strong irritation, extension occurs in the other. When the patient lies upon his back with both legs fully extended application of the electric current to the sole of one foot causes flexion of this leg, and a trifle later of the other likewise. Böhme suggests that these coördinated movements may be made use of in the treatment of the paralysis by eliciting coördinated movements instead of merely stimulating isolated muscles.

Further Observations on the Cerebral Heat Centers. Previous experiments by Ernest Sachs and P. P. Green[2] in stimulating the caudate nucleus faradically showed no temperature changes. Since then, ninety-

(1) Deutsch. med. Wochenschr., Dec. 7, 1916, p. 1501.
(2) Amer. Jour. Physiol., March, 1917, p. 603.

three experiments on cats and rabbits have been carried out. This paper also includes observation on over 150 craniotomies in human beings. There were thirty-one electrolytic lesions, sixteen injection experiments, and fifty-one reaction experiments, after Barbour's method. In the electrolytic lesions, temperature rises were noted, but controls showed just as much change. Injection of emulsion of cortex and caudate into the caudate showed similar temperature changes, but controls showed the same. The results of reaction by the Barbour method were variable, and a rise of temperature with cold water and a fall with hot was not observed.

These experiments did not confirm the view that there is a cerebral heat center.

The Effect on Papilledema of Removal of Small Quantities of Cerebrospinal Fluid by Spinal Puncture. Three cases of swelling of the optic nerves have been observed by William G. Spiller and G. E. de Schweinitz[8] in which the removal of a few cubic centimeters of cerebrospinal fluid had a remarkable effect. They state that lumbar puncture is occasionally followed by the subsidence of choked disc very much as it occurs after cerebral decompression. They conclude, in general terms, that lumbar puncture is not justifiable except in rare instances where there is a definite recognition that the increased intracranial pressure is due to cerebral or cerebellar tumor. But in meningitis, apparently in encephalitis, and in some forms of optic neuritis dependent on toxemia, for example, the influenzal types of optic neuritis, and perhaps in disc changes dependent upon fracture of the skull, it is a proceeding worth careful consideration. Although aware that occasionally such procedure is followed by undesirable consequences, they feel that a papilledema of five or six diopters is so grave a condition that lumbar puncture, even though brain tumor can not be absolutely excluded, would seem to be a safer procedure than the more formidable operation of cerebral decompression.

(8) Jour. Nerv. and Ment. Dis., July, 1917, p. 10.

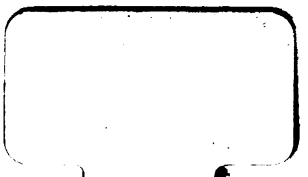
The Effect of High Explosives on the Ear. Cases of nerve deafness due to shell concussion can be divided, according to J. Gordon Wilson,[4] into three groups: (1) Those with nerve deafness; (2) those who have had nerve deafness to a varying degree and who have the fixed idea that they cannot hear; (3) malingerers. In this paper Wilson deals with the first group, which he roughly classifies as follows:

1. Cases of nerve deafness associated with damage to the conducting mechanism.
2. Cases without any visible or demonstrable lesion in the conducting mechanism, although this may have been present at the time of concussion.
3. Cases with destruction of the cochlea and of the semicircular canals or their nerves.

He states that as a result of the high explosive with constant increase of pressure in the ear there occurs a dissolution of the permanent auditory pathway and a spreading of nerve impulse into other adjacent paths. The auditory stimulus no longer reaches its goal and deafness results. Such a dissolution may occur at one or at all the synapses. It may not be complete and a maximal stimulus may still be able to get through. This distribution of the nerve impulse may help to account for the associated nervous phenomena. In the treatment of this condition, Wilson advises the employment of normal stimuli, as musical notes or voices, carefully graduated physical exercises, and warns against the use of electricity which, he states, is liable to produce vertigo.

The Syndrome of the Posterior Lacerate Foramen.[5] A man, aged 52, shortly after the appearance of a labial chancre developed enlargement of the glands on the corresponding side of the neck, and at the same time and on the same side paralysis of the internal branches of the eleventh cranial nerve, (hemiparalysis of the soft palate and larynx with acceleration of the pulse); paralysis of the ninth (disturbance of taste

(4) Brit. Med. Jour., March 17, 1917, p. 353.
(5) Abstracted from Rev. Neurol. and Psychiat., June 17, 1917, p. 194, from Paris méd., 1917, Vol. 7, p. 78.



mobile. Laryngoscopic examination showed "paralysis of whole right half of larynx, of the complete unilateral type (indifferent position of the vocal cord)." In the neck the sternomastoid was less prominent on the right, and there was a decided hollow above the clavicle, more marked with elevation of shoulder or abduction of arm. The clavicle was abnormally curved and caused a rather marked eminence. From the acromion to midline was 2/5 in. less on right. Seen from behind when standing there was slight drooping of right shoulder, more pronounced during walking. There was undoubted wasting in the supraspinous muscles. General sensation was perfect, including the tongue. With the exception of the pharyngeal reflex which was absent, the others were normal —no Romberg sign. Taste, smell, and hearing were normal. Sight: can count fingers at 5 meters; slight insufficiency of right internal rectus, other ocular muscles normal. Color perception good. RD of right sternomastoid, trapezius and hyoglossus. Wassermann frankly positive.

The above-described symptoms justify the diagnosis. The study of the paralysis of the last three pairs of cranial nerves presents some difficulties, for it is not always easy to map out the limits between the different syndromes, especially as the account of the symptoms of each of the latter given in the text-books is not uniform. As the vagus, accessory and hypoglossal run close together in part of their course, there is possible association of the different syndromes.

So far as paralysis of the accessory is concerned, we are well aware of the signs signifying involvement of its external branch. Of these signs all perfectly recognizable in the present case, there are two, to which, according to their discoverers, Sicard and Descomps, unusual importance should be attached: (1) Projection of the clavicle on the paralyzed side, which gives it an appearance of hypertrophy; (2) formation of a deep cavity in the supraclavicular region, visible in any attitude, but especially during elevation of the shoulder and abduction of the arm. To these fundamental signs

are to be added the following on the paralyzed side: (*a*) sternomastoid and trapezius less prominent; (*b*) drooping of shoulder, with lessened distance from acromion to midline; (*c*) external deviation of spinal border of scapula; (*d*) lessened abduction of arm (*e*) arm tires easily; (*f*) pain in shoulder and region of clavicle.

Most of these signs have to deal with paralysis of the trapezius—for the sternomastoid, in its triple rôle, which is to flex the head, to incline it to the side and turn it, finds its compensation in the action of the deep muscles of the neck—and, moreover, is not totally paralyzed, for it is innervated in addition by the third and fourth cervical branches.

It next remains to interpret the phenomena caused by paralysis of the internal branch of the accessory which at the level of the plexiform ganglion joins with the vagus, which in turn furnishes the innervation of the velum palati and the larynx. It is still undecided if it is due to the fibers of the accessory or those of the vagus itself.

Concerning the seat of the syndromes in their case, the authors state that it may be peripheral, there may be intracranial compression of the vagus-accessory, or again there may be a bulbar lesion.

While in their patient it is difficult to locate the exact seat, the absence of crossed motor or sensory alterations, and the clear establishment of the symptoms after an infection, incline them to the belief of a peripheral lesion.

Vertigo Due to Intracranial Disease. It is evident that vertigo or dizziness is present only in certain conditions, says T. H. Weisenburg.[7] First, there must be increase of intracranial pressure in which the vestibular fibers are indirectly implicated. Secondly, the lesion must involve the vestibular fibers directly and must be of such a character that the fibers are destroyed, for a slowly growing gliomatous tumor may not give any symptoms at all. Finally, the conclusion may be reached that vertigo in itself is not a focal

(7) Jour. Amer. Med. Ass'n., Sept. 8, 1917, p. 809.

symptom. Its presence or absence, however, helps in the diagnosis.

He says that the fiber tracts leading from the labyrinth through the vestibular nerve into the Deiter's group of nuclei and from there into the cerebellum, pons and cerebral cortex are by no means definitely known. Neither is there accurate evidence that there is a so-called vestibular center in the temporal cortex. Therefore, it is a mistake to assume that the fiber tracts are definite and that we know accurately their location. It at once becomes apparent that it is not possible by means of the ear tests alone to localize a tumor in a definite portion of the pons, cerebellum or medulla, or any of the constituent anatomic structures in which the vestibular tracts are located.

The Barany Tests in Brain Lesions. From an experience derived from clinical and pathologic findings Louis Fisher[8] believes that he is justified in asserting that spontaneous vertical nystagmus upward is a pathognomonic symptom of a lesion of the brain stem. He gives a summary of symptoms obtained by the Barany tests which may be recorded as follows:

When stimulation of the ear by the various methods employed produces no nystagmus, no vertigo, no past-pointing and no falling, a destruction of the labyrinth or eighth nerve may be diagnosed, and complete deafness on the same side confirms this diagnosis.

If stimulation of the horizontal semicircular canals produces no nystagmus but normal vertigo, and normal past-pointing, the lesion is in the medulla oblongata between Deiter's nucleus and the posterior longitudinal bundle.

If stimulation of the vertical semicircular canal produces no nystagmus, but normal vertigo, normal past-pointing and normal falling, the lesion is in the posterior portion of the pons, near the posterior longitudinal bundle.

If stimulation of the horizontal semicircular canals gives normal nystagmus but no vertigo and no past-pointing, the lesion is in the inferior cerebellar ped-

(8) Penn. Med. Jour., December, 1916, p. 175.

uncle on the same side or at a point further along the vestibulo-cerebello-cerebral tract.

If stimulation of the vertical semicircular canals gives normal nystagmus but no vertigo, no past-pointing, and no falling, the lesion is in the middle cerebellar peduncle, or at some higher portion of the vestibulo-cerebello-cerebral tract.

If stimulation of the horizontal and vertical semicircular canals produces no nystagmus but normal vertigo, normal past-pointing and normal falling, the lesion is in the posterior longitudinal bundle.

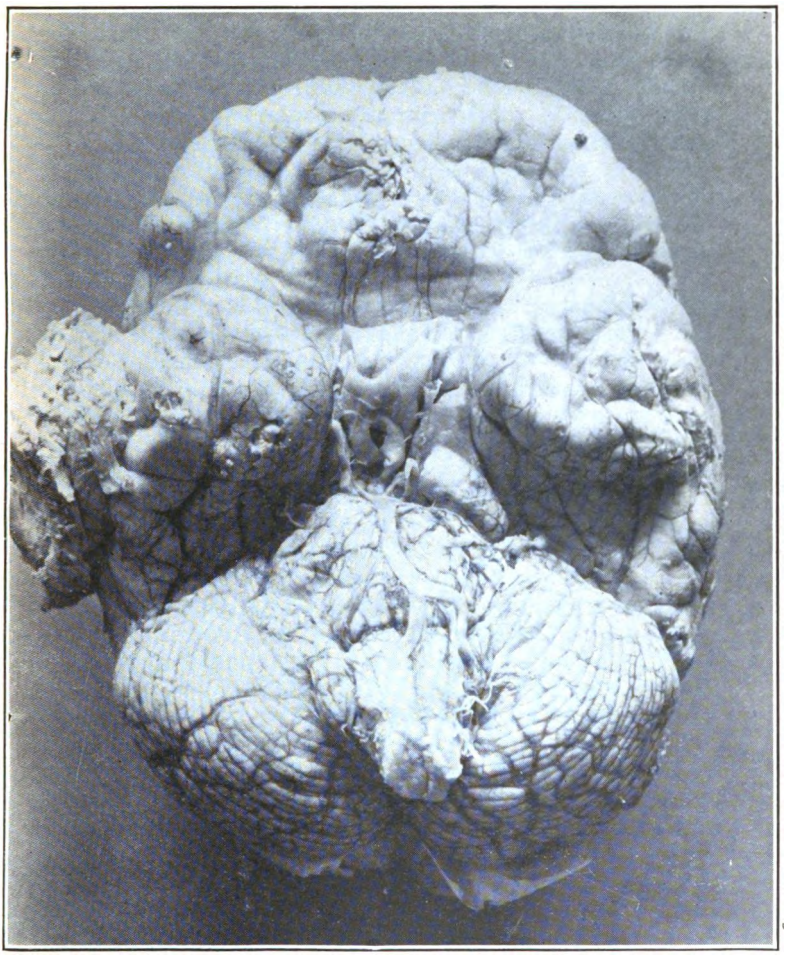
If stimulation of the horizontal and vertical semicircular canals produced normal nystagmus, but no past-pointing, no falling and no vertigo, the lesion is in the cerebellar nuclei of that side where the fibers from the inferior and middle cerebellar peduncles come together, or in the upper portion of the pons where all these fibers again come together at their decussation in the superior cerebellar peduncles.[9]

Anosmia and Sellar Distension as Misleading Signs in the Localization of a Cerebral Tumor. A case, the findings of which, in short, were those of pronounced general pressure phenomena is reported by Harvey Cushing.[1] The anosmia and the sellar distortion, though looked upon with suspicion, were regarded as secondary changes due probably to a posterior lesion, possibly a right extracerebellar tumor, accounting for the suboccipital discomforts, the slight lowering of hearing with tinnitus and partial loss of sensation and movement in the right face.[2] Though the symptoms in either case were unconvincing, the presumptive regional diagnosis lay between the subtentorial lesion and an interpeduncular one, though the choked disc and the absence of amenorrhea or other secondary pituitary manifestation spoke strongly against the latter.

At autopsy, a large endothelioma of approximately

(9) These tests were extensively referred to in the Practical Medicine Series, 1916, Vol. 10, pp. 109-116.
(1) Jour. Nerv. and Ment. Dis., November, 1916, p. 415.
(2) Reference to this symptom in this connection may be found in the Practical Medicine Series, 1916, Vol. 10, p. 117.

PLATE I.



Base of brain in case of large tumor of left hemisphere. Note moulding of under surface of frontal lobes and kinking of olfactory nerves which had resulted in anosmia—Cushing, page 12.

160-gram size was found on the left side, greatly displacing the hemisphere (Plate I). There was some thinning of the overlying skull which possibly should have been recognized during life. Cushing says that the secondary enlargement of the sella turcica produced by distant lesions was formerly misinterpreted on many occasions, but with our present increased familiarity with the various types of deformation of the fossa it is rarely mistaken for the enlargements from a local tumor.

A widening of the cup with more or less absorption of the dorsum often accompanies marked states of increased intracranial pressure and is particularly common with cerebellar lesions which have caused an obstructive ventricular hydrops. Under these circumstances, of course, there will be a high grade of choked disc and this combination of symptoms in the case under discussion was partly responsible for the early belief that there was a posterior lesion—a belief which was disproved by the failure to find a dilated ventricle when the decompression was done.

Anosmia may apparently be produced by a mechanical injury resulting in acute angulation of the olfactory tracts brought about by a herniation of the superjacent structures into a greatly distended interclinoidal space caused by pressure absorption of the pituitary fossa.

The Relative Frequency of the Various Causes of Coma. From a study of 400 cases of coma, Wayne W. Bissell and E. R. LeCount[3] conclude that more than half of the persons entering the Cook County Hospital in coma die during the first twenty-four hours after admission, but few live longer than one week, and, in this series at least, the accuracy of the clinical diagnosis is little affected by the element of time. One hundred and forty-four, or 36 per cent., of those 400 persons entering the Cook County Hospital in coma which terminated fatally were comatose from skull fracture; ninety-five, or nearly 24 per cent., of these from cerebral hemorrhage. It is most interesting to

(3) Jour. Amer. Med. Ass'n., Feb. 17, 1917, p. 500.

note that less than 5 per cent. of all these instances of coma were due to uremia, and it is similarly interesting to observe that, as a cause of coma, lobar pneumonia takes a position preceding uremia.

It is also apparent that 239, or 59.75 per cent., of these deaths in coma were due to skull fracture or cerebral hemorrhage, and of these, 165, or 69 per cent., received correct clinical diagnoses. The frequency with which skull fracture is observed with insignificant external injuries, and the common finding of bloody cerebrospinal fluid in persons comatose from spontaneous intracerebral hemorrhage lead the authors to believe that the diagnosis efficiency for skull fracture and cerebral hemorrhage is clinically very high.

THE NEUROSES.

General Considerations.

The Interpretation of the Neuroses. The biologic, pathologic and clinical considerations of the neuroses are discussed by Francis X. Dercum,[1] who says that of recent years, views and theories have been expressed concerning the neuroses which, if allowed to stand, would hopelessly and permanently confuse and obscure the subject. The mental symptoms of the patient alone are considered, and these are uniformly ascribed to sexual traumas, to repressed complexes, in which the essential rôle is always played by the *"libido."*

"The changes taking place in nerve cells, muscles and other structures during the exercise of function indicate a consumption of tissue—a consumption which depends directly on increased oxidation. Energy is eliminated as a result of this increased oxidation; further, of necessity, this elimination of energy means loss of substance. Functional inactivity, on the other hand, is accompanied by the restitution of substance."

"The excessive exercise of function leads primarily

(1) Jour. Amer. Med. Ass'n., April 28, 1917, p. 1223.

to the excessive consumption of tissue, and under these circumstances waste substances are present in abnormal amount." "The all-important inference from the foregoing considerations is the fact that fatigue is a real, a physical condition, and that it is not of psychic origin. Least of all is it to be explained as an attitude or state of mind the result of infantile sexual traumas."

Neurasthenia presents itself as a well-defined syndrome. While the picture is somewhat varied in different cases and often complicated by the appearance of secondary symptoms, its essential and underlying features are always those of chronic exhaustion, a persistent fatigue.

Of psychasthenia Dercum says: "That the clinical picture must be more or less modified when the organism has been previously neuropathic would seem probable on *a priori* grounds, and this the facts prove to be actually the case. . . . A person who is not neuropathic may under given conditions develop nervous exhaustion; if he happens to be neuropathic, special symptoms are developed which by their prominence dominate the clinical picture; indeed, often to such an extent that the factor of the nervous exhaustion may be lost sight of."

"The patient has a sense of powerlessness, insufficiency, inadequacy. He is hesitating, irresolute, timid, fearful. There is an impairment of the will, uncertainty and doubt, and, added to this, there is a diminished inhibition. Hesitation and lack of decision may become so pronounced that they develop into a *folie de doute;* weakness of will may lead to a pronounced abulia; and the fears may develop into special phobias, obsessions or anxieties."

"Clearly the foregoing considerations enable us to separate out of the group of the neuroses, first the nuerasthenic and secondly the neurasthenic-neuropathic states; namely, neurasthenia and, to employ the term of Janet, psychasthenia."

Our knowledge of hysteria, Dercum says, has been of slow and gradual evolution.

"Charcot clearly divined something of the nature of hysteria, when he drew an analogy between hysteria and hypnosis. Moebius, however, appears to have been the first to maintain that all of the symptoms of hysteria were of psychic origin. . . . It remained, however, for Babinski to make the next great advance, which was the recognition of the fact that the symptoms owe their origin to suggestion."

"Just as the reaction of the hysterical person to suggestion is so excessive as to be pathologic, so is his reaction to emotional stimuli excessive and pathologic. Exaggerated emotional reaction, exaggerated emotional expression, general emotional instability are therefore likewise features of the hysterical neuropathy."

The latter may be safely defined as innate neuropathy, "the essential feature of which is a feebleness of resistance to mental impressions and an emotional instability; in other words, there is a pathologic vulnerability to suggestion and an exaggerated emotional reaction. Again, hysteria is a neuropathy of degeneracy." Finally, Dercum asserts, hysteria presents a large element of heredity.

"Out of the group of the neuroses we have now separated three well-defined states: (1) neurasthenia; (2) psychasthenia, and (3) hysteria. A fourth now claims attention, namely, hypochondria."

"Hypochondria occurs without the presence of a single symptom of the fatigue neurosis or of a single hysterical stigma. It occurs independently of melancholia, of paranoia or of the various demented states. Its symptom-group occurs alone and pursues its own course. It is the expression of a diseased personality, of an abnormal condition inherent in the individual."

In discussing "neurasthenia symptomatica" Dercum says: "A few words are demanded by the nervous symptoms which now and then accompany visceral disease. Serious bodily disease, of course, weakens the entire organism, and that various signs of nervous weakness should be present is but natural. The symptoms, however, are never those of the fatigue neurosis,

of simple neurasthenia. For convenience, I have applied to them the term 'neurasthenia symptomatica.'"

"If neurasthenia is a physical condition, and if psychastenia, hysteria and hypochondria are innate neuropathies, extraneous factors play no rôle in their causation. That, however, psychogenic factors may, especially in psychasthenia and hysteria, play a rôle in the details of the individual symptoms there can be no question. A psychogenic factor can play on or influence only a pre-existing neuropathy."

"The foregoing consideration of the neuroses leads to a simple and natural classification, a classification which, as we have seen, was largely anticipated by Robert Whytt over a century and a half ago. The neuroses arrange themselves naturally into neurasthenia, psychasthenia, hysteria and hypochondria. Neurasthenia is the result of exhaustion; psychastenia of exhaustion occurring in a neuropathic subject; hysteria and hypochondria are both innate neuropathies, each defined by its own special characteristics."

In conclusion, Dercum says that it should be emphasized that the neuroses are physical, biologic and neuropathic in origin, and that psychogenic factors, when they play a rôle, do so merely in the surface manifestations.

The Newer Concepts of the Neuroses; an Estimate of Their Clinical Value. In discussing the various types of neurosis four important hypotheses are pointed out by Sidney I. Schwab.[2] They are in their order of importance: (*a*) Freudian psychology; (*b*) Janet's dissociation of consciousness; (*c*) Babinski's group of ideas; (*d*) the theory of congenital or acquired inadequacy. The point of view he presents is that the four theories contain in all probability some aspects of truth, though none contains all of the truth. The complex nature of the neuroses suggests the idea that no psychologic system at present in vogue can explain enough of the total problem to warrant including all of our therapeutic efforts at studying them under one head. He suggests a number of ideas which have

(2) Amer. Jour. Med. Sci., September, 1917, p. 338.

proved their worth to him by the test of actual experience.

1. The general admission that a psychologically indicated disease is to be treated by a psychologically planned theory.

2. No psychologic system or device contains more than a portion of the truth.

3. Therefore, it is justifiable to select as much of the truth out of any one system as seems worth while.

4. Psycho-analysis in the Freudian sense affords at the present time the most promising method of investigating and treating the neuroses.

5. The root notion of the Freudian psychology, that of sexuality, is to be regarded in the light of a hypothesis rather than a proved fact. The ideas associated with the terms repression, wish fulfillment, infantile traumata, dream interpretation, among the Freudian concepts are of practical, everyday value.

6. As a working theory toward the explanation of hysteria, and as providing a method of treatment of certain types of hysteria, the Janet theory of dissociation of consciousness is a useful one upon which to base synthetic therapy. In a negative way, the Babinski idea of hysteria should constantly be kept in mind. The theory of inadequacy furnishes to the physician a broad scheme of approach to many forms of neurosis.

These suggestions seem to Schwab to furnish a broad, general structure on which ideas of causation and mechanism of the neuroses and direct therapeutic attempts on these disorders may be based.

The Neurotic Constitution. Outlines of the Comparative Individualistic Psychology and Psychic Therapy. In this important book,[3] Alfred Adler presents the study of the neurotic character from a new point of view, describing the neurotic individual as one who shows a series of traits of character which exceed the normal standard, such as marked sensitiveness, irritability, suggestability, egotism, estrangement from reality, and often some special traits such as tyranny,

(3) Moffat, Yard and Company, New York, publishers.

malevolence, a self-sacrificing virtue, coquetry, anxiety and absent-mindedness.

Adler believes that the basis of these neurotic character traits is the fact that the person showing them is the possessor of what he terms "an inferior organ," and that in consequence of the feeling of inferiority which this produces an effort is made by the individual to compensate for this by so ordering his life and so regulating his every act that he may find that security of which the feeling of inferiority has robbed him. This is the fictitious goal of the neurotic and is also the fundamental and ultimate cause of the symptoms which develop when he is no longer able to succeed in dealing thus with reality. Adler regards the neuroses and psychoses as constructive creations which are built up under the influence of the dominant guiding idea which collects and unites into a group those psychic elements which it can make use of in its effort to attain security. The attempt fails because the direction is false, the condition becomes unstable, and the neurosis is the practical result.

[The trend of recent literature points to the necessity of a more rational viewpoint as to the analysis and interpretation of the various neuroses, and indicates the tendency to a broader and more tolerant definition of the classification and pathogenesis of these disorders. The schism produced by the introduction of the Freudian philosophy is being bridged through the admission of other factors. It is becoming more and more apparent that the psychologic basis for difference of opinion is not so divergent as superficial consideration would make it appear, and the pendulum of thought will probably swing back to a mean which will permit the admission of accessory theories relative to pathogenesis and treatment.—ED.]

PSYCHO-ANALYSIS.

Psycho-analysis and the Practice of Medicine. In a clear and concise discussion of psycho-analysis and the practice of medicine William A. White[3] says that the

most difficult concept to grasp is that our psyche bears within itself the records of its hundreds of thousands of years of evolution and development just as does our body. This past, the historical past of our psyche, is always growing, for as soon as the material of the present has been used as material in our growth, as soon as it takes its place in the path of our development by being used as a resting place for further superstructures, then it enters into our historical past. This is the unconscious.

As man has developed he has had progressively to give up more and more of his primitive, instinctive tendencies as the price for a higher civilization with all of its inestimable benefits. As these instinctive tendencies have been overcome, they have been relegated to the unconscious. That these cravings simply have been overcome and buried in the unconscious does not mean they have ceased to exist or that they have ceased to be able to influence the individual.

In the unconscious, then, we find the instinct motive for conduct, which is the motive of the familiar, the usual reaction (habit), the easiest way, in short, the pleasure motive. At the level of clear consciousness, reason and judgment hold sway; here the motive is the reality motive, a clear-cut, conscious, intelligent relating of the individual to the facts of existence, which involves, among other things, impressing of instinct in the service of reality and therefore effort, work. Psycho-analysis is essentially a study, by a special technique, of the unconscious for the purpose of learning the part the instinctive motives play in the life of the patient.

Here is the key to the situation: An analysis is for the purpose of reconstructing the psychologic history of the patient so far as that history bears on the formation of the symptoms. As soon as we do this we invariably find the symptoms represent, symbolize, a form of instinctive activity which belongs to the period of infancy and should have been renounced as the child

(3) Jour. Amer. Med. Ass'n., June 2, 1917, p. 1591.

grew to adulthood, but which, because of some special emphasis it then received, has been retained.

The implication is that a given individual may retain evidences of his infancy only in certain zones of his conduct, his gastro-intestinal tract, mouth, ear, eye, skin, genital or other zone. These are the so-called partial trends. If the tendencies of the individual as a whole, that is, all of his energies, are called by a single name, we may use the term "libido." Then these partial manifestations would be called partial libido trends.

The Libido: An analysis of the patient will disclose, then, that one or more of the libido areas has remained at its infantile level of development, has retained its infantile way of instinctive reaction, of pleasure seeking, has refused to grow up or, to sum it all up, has failed to socialize its libido.

Before discussing such character traits as these, however, White presents a list of psychogenic disorders culled from recent writers who are practitioners in various specialties, not psycho-analysts, for the purpose of emphasizing the interest in the psychogenesis of physical disorders which has recently arisen, and also because many or most of these ailments would be apt at least to be treated by other than psychologic methods. This list includes many forms of asthma, sore throat, difficult nasal breathing, stammering, headache, neurasthenia, backache, tender spine, "weak heart," fainting attacks, exophthalmic goiter, aphonia, spasmodic sneezing, hiccup, rapid respiration, hay-fever, gastro-intestinal disturbance (constipation, diarrhea, indigestion, colitis, gastric ulcer), ptosis of kidney, diabetes, disturbances of urination (polyuria, incontinence, precipitance), menstrual disorders, auto-intoxication (from long-continued digestive disturbances), nutritional disorders of skin, teeth and hair, etc.

Entrenched in its laboratories, psychology has carried on its work far removed from the every-day life of "the man in the street." But now that is exactly what psycho-analysis is demanding of it. Why

John Smith does not get along with his wife has always been a matter of absorbing interest to the neighborhood, but psychology has never dignified such a problem with its attention. It is through just such facts, however, it is because we do not get along with our wives, because we are not interested in our work, because we are not appreciated by our chief, or are imposed on by our associates, because we get too tired, sleep too little or drink too much, because our salary is too small, or we can not save, or the other fellow who does not do as good work as we do gets more, or a thousand other reasons, none of which for a moment causes the sufferer to seek the advice of a physician, that we are finally coming to see what makes the difference between a happy life, filled with usefulness, and failure.

Psycho-analysis is essentially an educational procedure. Its object is to clear away the rubbish which is obstructing the pathway of the patient so that he may have a chance to go forward. This is precisely what education tries to do. The psycho-analysts believe there are shorter cuts to the neuroses than by way of heredity.

From the cases White mentions, it will be evident that the theory which accounts for the latest neuroses assumes that the trouble began in the early years of childhood, not as the result of some concrete sexual trauma, as many people still think, but as the natural consequence of a fixation of certain areas of the child's interest, so that in this particular respect he does not grow up. The cause of this fixation, which, for our present purposes, we may call detention of the libido or interest on the road of development, is that the child's interest is too strongly attracted because of the undue pleasure premium which this particular area of interest offers. That all pleasure found in the last analysis is sex pleasure, is a hypothesis forced on the analyst by his daily experience; it is not an arbitrary hypothesis into which he tries to make every fact fit.

But there is another aspect of the matter which White thinks of especial importance: According to

Adler, character traits ultimately are reducible to terms of organic structure, and so defects of character depend on organ inferiority.

The Adlerian concept would substitute for the Freudian theory of "libido fixation" as an explanation for a given defect of character, the theory of an inferior organ. He believes that an inferior organ gives a sense of insecurity, inferiority, against which the neurotic tries to protect himself by so ordering his life, so regulating his every act, that he may find that security of which the feeling of inferiority has robbed him. This effort to find security is the fictitious goal of the neurotic who fails in attaining the maximation of his ego because his efforts are directed along this false path. He is not free to deal with reality at his best, but must always subordinate the demands of reality to the inner need of satisfying his craving for security. The neurosis of psychosis is therefore a constructive creation, a compromise, a compensation product, which, however, fails because of its false direction. His theory, summed up in a few words, reads: The neurotic constitution founds in an inferior organ; the inferior organ produces a feeling of inferiority: the feeling of inferiority creates the fictitious goal of the neurotic, whose symptoms result from an effort to mold reality along the false pathway that leads to safety.

White adds, as serving to bring the Adlerian and the Freudian theories together, that Adler asserts that wherever such organ inferiority can be demonstrated he has never failed to find also an inferiority of the sex organs.

He indicates that to acquire even a reasonable degree of proficiency in the technique of psycho-analysis, as in any other department of medicine, requires careful study and much thought. There is no royal road. Work is the password. But if he counsels work it is not to avoid the issues and have psycho-analysis shrouded in mysticism.

Even if one is not disposed to do analytic work, he suggests that, as psycho-analysis is met in the litera-

ture from time to time, one's attitude toward it should be that of Leibnitz toward a new book. He said:

"It is characteristic of me to hold opposition as of little account, exposition as of much account, and when a new book comes into my hands I look for what I can learn from it, not for what I can criticize in it."

Conceptions and Misconceptions in Psycho-analysis. Discussing the conceptions and misconceptions in psycho-analysis, Trigant Burrow[4] says that one does well to distinguish between psycho-analysis and rumors of psycho-analysis.

From the prevailing trend of current hearsay, it will have been inferred that this new method of psychotherapy proceeds on the assumption that nervous disorders—hysteria, obsessional and imperative states, so-called neurasthenia and psychasthenia—are invariably to be explained by the hidden presence of some abnormal mode of sexual indulgence and therefore, the origin of a neuroses, according to Freud's interpretation, is linked with the idea of some species of sexual delinquency.

As widespread as this conception has become, nothing could be further from the truth. Freud distinctly says that the neurotic and the sexual delinquent stand at exactly opposite poles to one another. Still another very prevalent misapprehension is the view that pscyho-analysis is synonymous with the obtaining of a general confession from the patient.

But the whole point in the psycho-analytic interpretation of the neuroses is that these disorders arise precisely from conditions which render voluntary confession impossible, it being the nature of the disturbing element that it remains of necessity wholly unknown to the patient himself. Let us bear in mind, then, that *the sphere of psycho-analysis lies exclusively in the field of unconscious mentation.*

Burrow does not by any means regard psycho-analysis as a universal panacea for nervous disorders, but on the contrary considers it as the particular method

(4) Jour. Amer. Med. Ass'n., Feb. 3, 1917, p. 355.

of psychotherapy that is most restricted in its possibilities of application, a reflection, however, which is rather comforting than otherwise. This being true, it seems a fortunate circumstance that psycho-analysis is not the suitable method in all cases—that other and simpler methods of psychotherapy are applicable in many types and degree of nervous manifestations, and even if sometimes unscientific, they are at least effective for the ignorant masses to whom they are applicable.

The fact is that psycho-analysis is practically adapted to only a few persons, but those few belong, generally speaking, to the most educated classes and are precisely those personalities who, from the nature of the conditions of the onset of a neurosis, are the most sensitive, highly developed and worth while among us, and whose re-education through self-analysis will be most far-reaching in its influence on the body social.

Psycho-analysis can never hope to become popular for the reason that it is honest. It does not flatter or cajole the patient or seek to appease him with subtle blandishments; on the contrary, it mercilessly thwarts and assails him. The mawkish and artificial will find in it little unction for their boredom.

Psycho-Analysis.—A Critique. In the opinion of Charles A. Mercier[5] psycho-analysis performs a very useful function. At present there is no systematic exposition of it, although there is a voluminous literature. Following are excerpts from Mercier's article:

"The writings of Freud and Jung, the chief priests of the cult, are disconnected and from this it has resulted that some of the most enthusiastic devotees of psycho-analysis have not grasped its principles." The first step towards the mastery of psycho-analysis, Mercier says, is to obtain a command over its vocabulary, and the chief term used in the art is "The Unconscious." The next most important term is "Libido." This, he says, has both an esoteric and exoteric meaning. To the initiated it means lust, especially morbid

(5) Brit. Med. Jour., Dec. 30, 1916, p. 897.

and unnatural lust, incest, pederasty, bestiality, etc., but its exoteric meaning is explained to those who are not fully initiated, and might be repelled by the esoteric meaning, as very different. To them it is explained as having the meaning of "wish" or "energy" or some other which is quite cleanly. "Mentality" is another favorite term of the psycho-analyst. It sounds as if it meant something, Mercier says, and it may be used when it is desired to strike an attitude to impress the reader with a belief in the superior attainments of the writer.

"Œdipus-complex" and "Electra-complex" are other terms for incestuous lust. With this glossary the student will be prepared for the study of psycho-analysis. "Its basic principles are two: The principle of sexuality and the principle of conflict. The first basic principle of psycho-analysis is that the key to every mental state, normal or morbid, is sexuality. On this principle we assume that every one of our thoughts has, whether we know it or not, a reference to sex; that every feeling has a sexual origin, every emotion a sexual nature, every act a sexual motive. These morbid and unnatural sexual thoughts and feelings are omnipresent in the lives of all. Everything solid that is seen, thought of, imagined, or especially dreamt of, and especially if it approximates to the cylindrical shape, has a sexual significance. It symbolizes the phallus." This, says Mercier, is the first cardinal assumption on which psycho-analysis is founded. It is not stated by psycho-analysts as an assumption, however. They state it as an ascertained and certain fact. The psycho-analyst teaches that sexual modesty and the conduct which it prompts are the products of education and a struggle, however unconscious, to repel and reject the temptations to think of obscene things. This, the author states, is where the second cardinal principal of psycho-analysis finds it application. This principle is the existence and activity of the "Unconscious." The reason that we are not aware of the terrible and vital struggle in which we are all our lives engaged to subdue the flesh is that

this struggle is carried on not in our minds but in our "Unconscious."

Mercier is not sure that it is possible to understand the meaning of this term, or that it has any substantial meaning at all, but after prolonged study of the writings of psycho-analysts he has arrived at what is, he thinks, in their minds. "The struggle in the mind between obscenity and chastity may be likened to a mutiny on board ship. Suppose such a mutiny in which the crew are struggling to overpower the officers, and the officers are struggling to subdue the mutinous crew. Suppose that you go on board the ship, and can find no sign of a struggle. Everything seems to be proceeding in a peacefully and orderly manner. The crew are to all appearance obeying the officers, and the officers are to all appearance in full control of the crew. It does not appear that any mutiny is taking place, and you are inclined to deny that there is any mutiny on that ship. You ask the nauto-analyst what reason he has to suppose that there is a mutiny, and his answer is that you are altogether deceived by appearances. There is a deadly struggle going on but you cannot see it because you are looking in the wrong place. What goes on in the part of the ship that you can see may be peaceful and orderly enough, but is of no importance whatever. *The mutiny is in the Overboard* of the ship, and what goes on in the Overboard is far, far more important than what goes on aboard the ship."

"If we want to understand what goes on aboard ship, the proper method is to study, not the behavior of the crew, but the Overboard, and if we want to understand what is going on in the mind, the proper method is to study, not the consciousness, but the Unconscious." Let us see, then, says Mercier, how the Unconscious is to be studied. "It would appear from what we now know of the Unconscious that the study of it would be attended by certain difficulties; but unfortunately, nothing in the world is easier. It is so easy that it appears positively childish; and the more we know of it the more childish it appears. There are two

methods of investigating the Unconscious: the verbal method and the method of dream-interpretation."

Mercier in an ironic manner then describes word association tests and finally dream analysis. He says that he has stated that psycho-analysis performs a very useful function; by this he means that it brings comfort, relief and satisfaction to many a sufferer, and many who use it have reason to bless Dr. Freud and Dr. Jung. The sufferers he refers to are not those upon whom the method is practiced, but those who practice it.

Finally, Mercier warns against the purpose of the psycho-analyst in attempting to teach children the nature of their conceptions and in this way to undermine the foundations of their morality.

[Such satirical references to the psycho-analytic movement as appears in the article by Mercier only emphasizes the fact that intolerance of a type of philosophy may serve to exclude any useful and illuminating factors entering into this philosophy from general therapeutic and diagnostic fields. It is far better to accept those factors which may be of assistance irrespective of the inadmissibility of the whole of such a philosophy to one's judgment. It is certain that psycho-analysis has taught us to obtain more careful and exhaustive histories, and, calling this method what one pleases, has enabled us in many instances to understand the make-up of an individual and to direct our efforts along proper lines of therapy, which lines necessarily do not need to be psycho-analytical alone.—Ed.]

Traumatic Neuroses.

The Traumatic Neuroses. In discussing the medicolegal considerations Edward E. Mayer[5] states that the right to recover damages for injury due to the negligence of others, is incontestable.

Our method of jury trials, in which biased opinions carry as much weight as do more careful if not more

(5) Jour. Amer. Med. Ass'n., Sept. 22, 1917, p. 958.

competent, ones is unfair. How to remedy it is not, however, clear. Since our common law permits each side in litigation to secure as many experts as they desire, the legal firms which specialize in accident cases and others, also, by employing physicians on contingent fees, sometimes unduly large, have always at their call physicians who, sharpened by experience, give their testimony the proper bias to influence the jury. This conspiracy of interests is reprehensible.

Jury awards with us seem to place a premium on exaggeration, and a proper staging of the dramatic possibilities of the client secures an increased verdict. Awaiting for years a settlement nullifies all efforts to bring a claimant for damages back to usefulness, and the psychic effects of not desiring health, together with the bringing on of postural spasms and contractures through fixed positions, often in themselves do much harm.

Mayer suggests that all court testimony of physicians be placed on file by their county societies. Publicity would tend to stop a certain class of medical testimony. It would not prevent ignorant or mistaken testimony, but bought testimony and substituted diagnoses would be less likely to be offered.

Medicolegal opinions should never be based on subjective symptoms, and only objective symptoms should be utilized or permitted in making a diagnosis in court. The subjective symptoms are not based on actual facts. If the physician has examined the injured person, he should refuse to answer any hypothetic questions unless they included his objective findings, and his answer should be predicated on them.

No statistics concerning prognosis should carry much weight in court because of the personal equation of the nature of the accident and the social status of the patient, and the different groupings found in statistics and variations in the laws of different countries. The future of each psychneurotic patient must be determined separately by studying his social habits, age, nature of work, intelligence, emotional complexes, etc., as well as the kind of accident and diagnosis offered.

Perhaps, since the post-litigation results are often so radically different from what is claimed, interested corporations should work to secure a law giving them the privilege of an examination at any future time. The results of such re-examination, if it was revealed that the compensation was based on false claims, should empower the court to reopen the case.

[Reference to the traumatic neuroses may be found in the Practical Medicine Series, 1913, Vol. 10, p. 21. This subject will assume far greater importance in the light of the injuries of warfare, and will probably be responsible for a reconstruction of the existing disability and pension laws.

The author's criticism of medical experts is echoed by physicians and jurists alike. One of the most discouraging features that the Illinois Industrial Commission has had to contend with has been the divergence of opinions of medical experts, which opinion, the Commission, as laymen, have been compelled to interpret as a basis for the adjudication of claims.—ED.]

NEUROSES OF THE WAR.

War and Neurosis. In summing up the effect of war upon the nervous system Clarence B. Farrar[6] finds that:

1. Cases with gross lesions of nervous disease, peripheral or central, present questions essentially surgical and neurologic. Specific and psychotic symptoms do not, as a rule, accompany them. In particular, such lesions do not give rise to the so-called traumatic neuroses.

2. Apparently any individual of sound constitution and inheritance may at the front exhibit minor, transitory neurotic symptoms, which are strictly reactive and may be classed as physiologic.

3. That the severe war neuroses may also, under certain circumstances, develop in persons apparently quite normal has been asserted by competent observ-

(6) Amer. Jour. Insanity, April, 1917, p. 693.

ers, but the concept of "normal" is so elastic that a definitive answer to this question may never be forthcoming.

4. It remains true, however, that in the majority of severe war neuroses of all types there is evidence of the personal element of psychopathic potential.

5. The factor of exhaustion may lead to collapse or transitory fatigue states and, if severe and protracted, to progressive physical deterioration. War experience has not established its etiologic importance in the neuroses or psychoses.

6. Psychic disturbances among troops may be (*a*) accidental, such as occur in the community generally and can not be attributed to service; and (*b*) reactive, those which stand in some specific relationship to army life.

7. The reactive group is made up essentially of psychoneuroses which may be divided epochally into "anticipatory neuroses" and "trench neuroses."

8. The type of "trench neurosis" is the condition called shell shock, which usually consists of a transitory concussion syndrome followed by a more or less protracted neurotic phase.

9. Trench neuroses occur usually in unwounded soldiers. There is no satisfactory evidence that trauma plays any part in their causation. There are well-qualified observers who hold that as a result of contemporary military experience the concept of the so-called traumatic neurosis should be abolished.

10. The drift of opinion is unmistakably toward the psychogenic basis of war neuroses of all types, including shell shock. Even in the initial unconsciousness or twilight state of some duration, there is evidence that the psychogenic may have as great, if not a greater, rôle than the item of mechanical shock, although this is also important.

11. Clinically, the trench neuroses present in the main hysteric and depressive neurasthenic syndromes, or combinations thereof.

12. Their distinctive character resides in the fact

that the precipitating causes are unique and strongly color the symptom pictures.

The Neuroses of Returned Soldiers. In the opinion of Goldwin W. Howland[7] the cause of neuroses of returned soldiers in the great majority of cases, has been the explosion of shells in the immediate neighborhood of the affected man, and the belief is apparently well-grounded that the vibrations, produced by these explosions, are the immediate cause of a disturbance in the physiologic integrity of the nervous system.

A second group of cases is composed of those who have been buried alive by the shell explosion, and the cause is evidently parallel with the first.

In a third group the men have been exposed to much fighting and have been for some time under fire, and may have had several temporary trips to the hospital, for milder attacks, but have finally, under the continued strain, become shell-shock victims, and been forced to return to their home.

Finally, there are those who have been exposed to little trench strain, but who may be said to be more psychical, than true traumatic examples of the disorder.

In the usual type there is a fine tremor of the hands, this being the cardinal symptom in many cases and to this is added over and over again the annoying complaint of sweating. Sleep is usually greatly affected. The memory of these soldiers is always poor. In very few cases has Howland seen these men complain of their viscera, with the exception of the heart. Along two forms of sensation, however, they do show a great increase in perceptive irritability, and those are sight and hearing. The main characteristic is the increased excitability. At times a patient will burst out crying on slight provocation and especially if there is some question under discussion to irritate or excite him.

The men are usually unduly irritable and will tell you that they find that before they can use their judgment under some simple but annoying detail they are

(7) Amer. Medicine, May, 1917, p. 313.

so nervous or excitable that they act without the necessary control. Tics of the face are common. Motor weakness is seldom complained of. Sensation is affected mainly in two ways: namely, in connection with headache and with backache. Fainting attacks are found in the majority of cases. They vary from slight dizziness to actual slight loss of consciousness, and must be carefully separated from the similar *petit mal* attacks characteristic of epilepsy.

Other vasomotor conditions are the marked reactions to skin dermatographia, and the cold hands and feet, and also the sweating already referred to. One meets with rapidity of the heart's action as almost a constant symptom, and this will be found to occur in varied degree. Respiratory disturbances have been quite rare.

Apart from some cases of vomiting and loss of appetite it has been really remarkable how few have complained of ailments of this class. A number of men complain of incontinence of urine. They have frequently lost sexual power, and there is no power of erection.

In dissociation the memory is frequently blotted out for long periods of time, and while it may be completely lost, yet as a rule in Howland's cases the lapses have been for definite periods. This primary loss after the accident is generally associated with periodical attacks in which the victims lose all knowledge of their present surroundings, and wander as if in a dream.

As to the simpler forms of dissociation they are fairly common, and are met with as amblyopia and field retraction, deafness, various forms of hysterical anesthesia and many forms of motor paralysis. One condition that might fall under this heading is the development of stammering by many men. One meets over and over again with functional contractions of the arms and legs, and with peculiar movements regularly performed of various parts of the body. As a whole, the prognosis is very good indeed.

Howland's advice is: "watch your man and see what appears to benefit him most, and be full of encouragement and you may expect good results."

The Treatment of Some Common War Neuroses. The object of the paper by E. D. Adrian and L. R. Yealland[8] is to describe a method which they have found to be extremely useful in dealing with war neuroses.

The method is certainly not new, indeed it is probably employed in some measure by all who have had much to do with functional disorders. The most important part in the treatment of a functional case consists in making up one's mind that the case is functional. We must take into account two distinct conditions in considering treatment and prognosis. These are (*a*) the fixed idea which is giving rise to the functional symptom, paralysis, loss of speech, and so forth. and (*b*) the state of mind which has allowed this fixed idea to develop. The fixed idea can be treated successfully by suggestive methods and the patient can be restored to apparent health, but there is no reason to suppose that his mental instability will vanish.

There are three principles involved in all methods of treatment, namely: (1) suggestion, (2) re-education, and (3) discipline. The aim of suggestion is to make the patient believe he will be cured, and to lead him on from this to the belief that he is cured. Re-education brings the disordered function back to the normal by directing it until the bad habit is lost, and disciplinary treatment breaks down the unconscious resistance of the patient to the idea of recovery. As an example of a process which aims at curing by pure suggestion we may consider treatment by hypnotism. An example of treatment in which the disciplinary element is very much to the fore is the use of strict isolation in hysterical cases. Under the heading of re-education may be included the method of simple persuasion in which the patient is convinced by logical argument that his condition is not so serious as he supposes. The method which the authors have finally adopted consists in a very brief suggestive treatment followed by rapid re-education, which is continued, if

(8) Lancet, June 9, 1917, p. 887.

possible, without a pause until the normal function is entirely regained.

The suggestive treatment may take any form, but it is essential that the patient should be convinced that it will produce an immediate recovery. In untreated cases there is barely any difficulty in this, and the conviction can be strengthened by using a form of treatment which will be capable by itself of evoking some part of the function which is temporarily in abeyance. For instance, a case of mutism may be cured by tickling the back of the mouth so as to induce reflex phonation. The patient is compelled to make a noise, and the fact that he has done so will convince him that the treatment will be effective. In the same way, a strong electric stimulus will produce a sensation and motion in a limb which is supposed to be anesthetic and paralyzed, and this in itself will be enough to convince the patient that he is on the road to recovery. Occasionally this form of treatment has been tried before and has failed because the operator had not enough confidence in the method. In this case it is, of course, useless to repeat the same procedure, and we must fall back on some other form of treatment in which the patient will have greater faith.

The simplest form of suggestive treatment to apply is the faradic current. The only difficulty arises when the patient has already been subjected to a long course of electrical treatment without result. It is as well to find out whether the treatment was painful or not. If it was not, the patient will generally yield at once to painful faradization with a wire brush after he has been informed that this kind of electricity is far more potent than any he has had previously. If this, too, has been tried before, the suggestive treatment must take an entirely different form.

Whatever form of treatment is employed, the patient must be convinced that the physician understands his case and is able to cure him. This idea should be fostered from the moment the patient enters the ward. The case is investigated as briefly as possible, and each physical sign is accepted as perfectly normal in the

circumstances, and not as in any way interesting or obscure. The best attitude to adopt is one of mild boredom bred of perfect familiarity with the patient's disorder, and if the case has to be exhibited to anyone else it is shown not as anything unusual, but as a perfect example of the type of case which is cured in five minutes by appropriate treatment. After the examination the patient is met with the absolute assurance that he will be cured as soon as the physician can find the time to treat him. It is better to avoid discussing the case and the methods which will be adopted to cure it. The barest statement should suffice, and the patient should be silenced at once if he attempts to air his own views on the subject.

The treatment is best carried out in a special room set apart for the purpose, where there will be nothing to distract the patient's attention. As soon as the least sign of recovery has appeared the re-education is begun. The patient is given no time to collect his thoughts, but is hurried along by a mixture of persuasion and command until the disordered function has completely recovered. The man is never allowed any say in the matter. He is not asked whether he can raise his paralyzed arm or not; he is ordered to raise it, and told that he can do it perfectly if he tries. Rapidity and an authoritative manner are the chief factors in the re-educative process, and in every case an effort should be made to produce complete recovery before the patient goes back to the ward. If the treatment has to be discontinued before recovery is complete the patient should be assured that he will be quite well in twenty-four hours and the re-education should be continued as soon as possible.

In deafness, as a rule, the patient is stone-deaf and often dumb as well and there may be associated symptoms, such as loss of vibration sense in the bones of the skull. The patient is told in writing that he will be cured in five minutes by electricity. The suggestive effect may be enhanced by the use of a darkened room, a head mirror, and so forth, but the essential treatment consists in applying a strong faradic current to the

side of the head or to the external auditory meatus. The patient is informed that as the feeling comes back the current will appear more and more painful, and that in a very short time he will be able to hear the tick of a watch pressed against his ear. The current is applied for a few seconds at a time and increased in strength between each application. When the patient begins to show signs that the current is painful he is told that the feeling is returning and that he will soon hear perfectly. A watch (or a tuning-fork) is pressed closely against his ear between each application of the current and in less than five minutes he will begin to hear it. After a few more applications of the current he will be able to hear the watch at a distance of a foot or more. Sometimes he is able to hear the ticking of a watch, but is unable to interpret what is said to him. He is then re-educated, beginning with the vowel sounds, then with words of one syllable, then two, and so on, until he can hear perfectly. If the other ear has not recovered at the same time it is a simple process to restore the hearing to it in the same way. The cure is usually complete in less than ten minutes.

In mutism complicated by deafness, it is, of course, natural to treat the deafness first, as this makes communication with the patient so much easier. As soon as he can hear the patient is told that his speech will be restored in the same way. A long pharyngeal electrode is used, and he is told to sound the vowel "ah" as soon as he feels the current. The soft palate and pillars of the fauces are stimulated, and as a rule he phonates loudly as soon as the electrode is applied; he is then told to repeat the other vowels, the letters of the alphabet, numbers, days of the week, etc., and he is soon able to enter into a conversation.

When mutism has existed alone it is often unnecessary to do anything more than tickling the back of the patient's mouth with a mirror or tongue depressor. This evokes some reflex phonation in the form of gurgling or retching, and the patient is then told to say "ah." The process is repeated until he can do this

naturally, and it is then a simple matter to make him sound the other vowels and to repeat the whole alphabet in an audible voice. In still milder cases the patient will phonate loudly when he coughs or gargles, and he can then be made to sound "ah" by gradually eliminating the explosive element of the cough.

The first signs of voluntary phonation must be followed up immediately, and the patient must be given no respite until he can speak perfectly. He is, of course, instructed beforehand that the treatment will effect a complete cure, and he must not be allowed to go back to the ward whispering or stammering, even though he may regard this as an immense improvement on his former state.

Cases of paralysis of one arm are very common and very easily curable. As a rule they occur after some slight wound or bruise which has necessitated the use of a splint.

The patient is told that he is very lucky to have come off with such slight injury, and that his arm will be set right in five minutes by the application of a special form of electricity. He is made to sit on a large pad electrode connected with an induction coil, the other terminal being connected with a wire brush. He is informed that the first effect of the current will be to bring back the feeling in the forearm, and that as the feeling returns the power will return with it. A fairly strong current is turned on, and the wire brush is drawn downward over the forearm from the elbow to the wrist. After a few applications the patient is told that he can now feel as far down as the wrist, and he is tested with a pin to convince him of the truth of this. If he can not feel the pin-prick, the current is increased in strength until he can do so. The same process is applied to the hand until this, too, ceases to be anesthetic. The improvement is pointed out to the patient and he is told that as the feeling has now returned to his arm it will be a very simple matter to restore the power of movement. After a few touches with the electrode designed to produce contraction in the muscles he is told to move

the arm. He will do so at first in a hesitating manner with every appearance of great effort, but this will be quite enough to convince him that the power is really returning. The rapid re-education follows at once. He is given no time to think but urged to move the arm more and more strongly, to grip the physician's hand, to flex and extend the elbow, etc., and the pressure is not relaxed until the whole limb has returned to its normal vigor. If the improvement comes to a standstill before recovery is complete, the faradization is repeated with stronger and stronger currents. Rapidity and an air of authority which will brook no denial are usually quite enough without this, and if once the recovery is complete there will be little fear of a relapse. If the patient's manner suggests that he is likely to relapse as soon as he leaves the hospital, he is told that this is very unlikely, but that if it should occur he should report sick at once and come back for treatment with a current far stronger than that already used. Needless to say it is rarely necessary to carry out this proposal.

[A considerable length of time will be necessary for extensive observations of the neuroses of warfare before they can be clearly delineated. It may readily be seen from even a superficial analysis of the cases of shell shock that in this group are included in a more or less haphazard manner cases not only of the neuroses, but any cases which are inexplicable from their objective and subjective findings. That this is the case is not strange when one considers the fact that there was thrown upon the responsibility of civilian physicians with no particular neurologic training a large number of neurologic cases. The necessity for the grouping of such cases under a term which would be admissible to the understanding of army officials explains the invention of the syndrome "shell shock," and it will be possible to digest and classify such cases only after a lapse of a certain period of time during which competent neurologic observation and research may be made upon these cases.—Ed.]

The Psychoneuroses of War. A small book with this title has been written by MM. Roussy and Lhermitte, and is analyzed by P. Béhague.[9]

It is necessary clearly to separate psychoneuroses which are unconscious and involuntary from true simulation where the troubles are created *de novo* by the subject, or by exaggeration and persistence of symptoms of some organic lesion which has disappeared.

The motor reactions are by far the most common, hemiplegia, monoplegia and psycho-neuropathic paraplegia are encountered at each instant. They are spasmodic or flaccid, and sometimes there is even flaccid hemiplegias of the upper limb with contractures of the lower one.

In the flaccid type, if we order some movement, we see some muscular tremblings in the muscles antagonistic to those which should contract in the contracture types; the tendon reflexes are sometimes exaggerated as explained by the muscular atrophy, while the patches of anesthesia explain the abolition of cutaneous reflexes. The contractures yield neither to motion nor to application of the Esmarch band. Hence the diagnosis is difficult, nevertheless it may be made owing to the less prominent signs of organic hemiplegia: extension of the toe, muscular hypotonia, associated movement of the thigh and the pelvis—complementary opposition—signs of Rossolimo, Mendel-Bechterew, Oppenheim, finally the signs of contractions of Marie-Foix.

The limited paralyses, the acroparalyses are very common and simulate a radial paralysis of the hand or of the external popliteal in the foot.

The acrocontractures are often encountered under the form of clenched fists, ulnar or total claw of the arm; in the leg they frequently assume the shape of talipes equinovarus.

While the acroparalyses are rapidly curable, this is not the case with the acrocontractures. The latter, when of long standing, give rise by their persistence

(9) Rev. Neurologique, June, 1917.

to real organic troubles, hard to distinguish—not only from those of prolonged compression (cord) at the root of a limb—but from the physiopathic or reflex contractures of Babinski-Froment.

In these last, Roussy and Lhermitte observe that all the signs proper to the reflex disturbances are secondary to the hypothermia, the venous stasis and the immobilization, and all of them may be encountered in subjects with psychoneurotic stigmata, who have not been wounded.

Similar to the acrocontractures are the contractures of muscles associated in their actions—*e. g.*, of the sternomastoid and the trapezius leading to neuropathic torticollis, and contracture of the extensors of the head simulating acute meningitis or tetanus. Again, the contracture involves the extensors of the spine, producing lordosis, or if it involves the lateral muscles, kyphosis; also camptocormia when it attacks the muscles flexing the trunk forward. This bending of the trunk is differentiated with difficulty from Pott's disease, rhizomelic spondylosis, vertebral ankylosis, contusion of the intervertebral disks, lastly myogenic ankylosis of the spine.

Execution of automatic and voluntary movements at the same time, such as walking and standing, may be greatly interfered with by psychoneurotic phenomena. Then we have to deal with astasia-abasia, *i. e.*, dissolution of of the automatism of walking—a true neurosis which may assume different forms: choreiform, tabetic, neurotic or saltatory. At other times there is stasiphobia, the patient can not stand erect.

These troubles are easy to distinguish from the symptoms created by organic lesions which in turn bring on reflex disturbances, or from labyrinthine affections. However, the distinction may be rather difficult when neuropathic and organic troubles are associated.

Among the disorders of walking may be mentioned the habitual limpings in those in whom the vicious attitude is due to the following: The patient limps because he suffers; then the organic element disappears;

he limps from habit; finally, in the last stage, the patient suffers because he limps.

The trembling and tics develop, either immediately after some commotion or after a period of meditation. The tremblings may be general, or local, in this case simulating chorea or cerebellar affections.

Tics are rare, most often of the classic type, they are localized in the head (tic of affirmation, of negation).

These psycho-neuropathic accidents are revealed by their onset, by the associated symptoms, and, above all, by the individual's psychic state.

Certain writers attribute these disorders to organic conditions, but the authors dissent from this, in view of their curability by psychotherapy.

Next come the sensory troubles, objective or subjective. The algias not corresponding to any organic trouble are frequent, especially in the lower limb, where they assume the sciatic type. One should not trust too much in the signs of Lasègue and Bonnet, nor the Valleix points, but only in the reflex symptoms. In case of doubt, psychotherapy is always indicated.

In the trunk, the algias assume the form of rachialgia which little by little leads to camptocormia or lumbago—or again may simulate intercostal neuralgia, pleurisy or appendicitis.

In the neck, they accompany clonic or tonic torticollis; lastly, in the head, they manifest themselves under the form of particularly rebellious headaches, as well as precordial, cystic or gastric pains which do not rest on any organic basis. The diagnosis, ordinarily easy, should be made early.

The alterations of objective sensibility are still more frequent, though they do not correspond to any nerve territory, either root or peripheral; they are readily recognized. One should search for them by Babinski's method, which, if it were always employed, would avoid creating anesthetic zones due to nothing but the repeated examinations.

The psychosensorial troubles are well known. The

deaf-mutes assume three types: delirious mental confusion, stupid mental confusion, and "babbling."

Isolated deafness is rarer, it must be differentiated from the true deafness by ruptures of the tympanum, or to labyrinthine involvement in which there are higher voice and speech disturbance.

Isolated mutism is often accompanied by disordered deglutition, sometimes there is merely aphonia or stammering.

Among other psychoneurotic manifestations are amaurosis, amblyopia, photophobia; to these should be added, blepharospasm and nystagmus. All these accidents are diagnosed as quickly as they are cured, as is the case with hemianosmia and hemiageusia.

Incontinence of urine is common, appearing in a subject after commotion or one with old benign lesions, it is sometimes difficult to differentiate from a larval attack in the cauda equina. According to the authors, anuria, retention, troubles of the anal sphincter, are never neuropathic.

Lastly, the psychoneuropathic reaction may be fixed in the digestive tube (vomiting) the respiratory apparatus (tachypnea) or the circulation (tachycardia).

It is not necessary to call attention to the crises of anxiety or of motor agitation recalling the classic hysterical crises. But, it should be noted there are psychic troubles purely neuropathic—narcolepsies, confusional states or again delirious and fleeting ones. Under such circumstances, diagnosis is difficult, for psychic troubles of organic origin may follow in trephined individuals. They also account for the lefthandedness after war injuries like that seen following industrial accidents.

The authors then direct attention to the *commotional syndrome*. After a period of excitation, the subject falls into a confused or neurotic state. Following this there is persistent headache, a state of hypermotivity and psychasthenia, which may make these individuals true "intellectual cripples."

In the genesis of these troubles we must distinguish: direct commotion, often accompanied by contusion

and leading to organic affections; and the indirect, the source of the purely neuropathic accident.

In the general etiology of all these accidents, if a great influence is attributed to the morbid neuropathic constitution, we must also take into account the depressing rôle of fatigue, either physical or moral, temporary inanition, together with the intoxications.

Lastly, it is to be noted that the neuropathic conditions are less common in officers than in the men.

The determining factors are: Direct or indirect commotion, and especially emotion, which for the authors plays the primordial part, if to this we add the local trauma and autosuggestion or heterosuggestion.

Two points dominate the treatment: The inclination and skill of the attendant physician, and the rapidity with which the affections are treated.

All psychoneuropathic disorders can be cured; the marked psychopaths alone are to be separated and sent in to the psychiatric center.

Finally, the surroundings are of great importance. There must be rigorous discipline, every inveterate patient is to be kept in bed on milk diet; every man showing marked crises is to be isolated.

Treatment proper is as follows:

First, after a persuasive conversation, obtain from the patient an oath that he really wishes to be cured.

Second, the subject is isolated, this alone often cures him or induces him to accept electric treatment.

Third, electric treatment with a galvanic apparatus with a fine wire, proceeding from the less sensitive to the most painful areas, slowly increasing the current and changing from the pad to the metallic brush.

Fourth, and lastly, fixation of the results obtained by sustained physical and psychic re-education.

In the first stage, we may establish the diagnosis and time necessary for treatment; in the second we obtain cures; in the third, the cold douches in interrupted jets may replace the faradic current and bring on equally prompt cures.

Finally, the fourth stage should be long enough to avoid recurrences.

Under these conditions, the results are very happy, and there are but 2 to 3 per cent. of failures.

In short "to wish to cure a psychopath, is to engage with him in a moral contest from which one should emerge the victor."

The authors lay down the following directions for the military authorities:

1. No man should be returned to the ranks until a sufficient time has elapsed to be sure the cure is permanent.

2. Furloughs for a week should be given only to such men as have manifested goodwill during treatment.

The inveterate patients should be directed to the special centers, but under no pretext are they to be proposed for reformative measures.

Chorea.

Huntington's Chorea in Relation of Heredity and Eugenics. In the course of the work of the Eugenics Record Office the attention of Charles B. Davenport and Elizabeth B. Muncey[10] was called to a focus of Huntington's chorea located within 100 miles of the office. A study of four families in eastern Long Island shows that in nearly 1,000 cases of Huntington's chorea, practically all can be traced back to some half dozen individuals, including three (probable) brothers who migrated to America during the seventeenth century. Already numerous "biotypes" having specific and differential hereditary behavior have appeared. Thus, there is a biotype in which the tremors are absent, but mental deterioration present; a biotype in which the tremors are not accompanied by mental deterioration; a biotype in which the chorea does not progress; a biotype in which the onset of the choreic movements is in early life. In general, the symptomatology of chronic chorea is dissimilar in different strains of families. The age of onset, the degree of muscular involvement, the extent of mental deterioration all show family dif-

(10) Amer. Jour. Insanity, October, 1916, p. 195.

ferences and enable them to recognize various species of biotypes of the disease. These biotypes are less striking than they would be were it not for the exhaustive hybridization that is taking place between these biotypes in random human matings.

The method of inheritance of some of the elements of Huntington's chorea has been worked out. In general, the choreic movements never skip a generation and in other respects show themselves clearly to be a dominant trait. The mental disorder is usually of the hyperkinetic or manic type, and this also shows itself as a dominant. The age of onset apparently tends to diminish in successive generations, but this is due to the fact that in comparing age of onset in grandfathers with that in grandchildren we are not comparing on the same basis. Among the 3,000-odd relatives of the 962 choreics studied many nervous traits are recorded. Thus, epilepsy is recorded 39 times; infantile convulsions, 19 times; meningeal inflammation and brain fever, 51 times; hydrocephaly, 41 times; feeble-mindedness, 72 times; Sydenham's chorea, 11 times, and "attacks" 9 times.

Of startling importance is the authors' statement that despite the fact that for generations there have been individuals who recognized the hereditary nature of the disease, there is no clear evidence that persons belonging to the choreic lines voluntarily abstained to any marked degree from, or were discriminated against in, marriage.

Epilepsy.

Differential Diagnosis of Convulsions.[1] Flatau, in attempting to differentiate convulsions, comments on the difficulty of differentiation when there is merely an aura without an actual seizure. When the patient complains of things seeming to turn around, or to be removed to a distance, or to become very small, the trouble is more likely to be hysteria than epilepsy. He insists that an actual epileptic seizure must have oc-

(1) Med. Klinik, Jan. 7, 1917, p. 1.

curred before it is possible to label the case epilepsy. Epilepsy is much more likely to be the condition if the attack occurs at night waking out of sleep. Fainting may at times be the earliest indication of a tendency to epilepsy, and it is frequently impossible to distinguish a fainting attack from *petit mal.* The loss of consciousness is comparatively brief in epilepsy, and rarely lasts longer than half an hour, while in hysteria prolonged unconsciousness is the rule, although it is not as consistently profound throughout the time. Violent flinging about of the arms and curving the whole body speaks for hysteria, but it is not impossible for an epileptic to have an hysterical attack. Flatau has found a history of migraine so frequent in one of the parents that he considers it to be closely related to epilepsy.

[The latter has been an observation common to many neurologists and is certainly the outstanding feature of the predisposing factors which may be obtained from the history of a large number of cases of epilepsy. Not only is this true, but often such patients may suffer with a migraine prior to the development of the epilepsy which ceases at this time only to reappear when the epilepsy might disappear.—Ed.]

Epilepsy: A Metabolic Disease. From observations carried over a long period Guy P. U. Prior and S. Evan Jones[2] were enabled to value the daily changes in the metabolism of epilepsy, and their conclusions may be summarized thus:

The calcium index of the blood is low in epileptics with a tendency to rise after a serial attack. The excretion of calcium in the urine is low but shows a rise some days before a series. The coagulation time is shortened, with a further shortening before a series and a lengthening after. The alkalinity of the blood is low in epileptics and there is a fall before a fit. Phosphorus excretion has been observed to be low in some cases before a series.

The authors think that the periodic crises of epilepsy represent an exaggerated psychomotor reaction, there

(2) Jour. Mental Sci., January, 1917, p. 86.

being an afferent impulse which excites a wide area of the cortex and causes unconsciousness and an uninhibited motor excitation, the abeyance of inhibition being the consequences of deficient resistance or refractivity at the synapses and due probably to disordered calcium metabolism.

Persistent Treatment of Epilepsy. The theory of Howell T. Pershing[3] is that by means of the familiar bromide treatment, with certain not very irksome hygienic precautions, a great reduction in the number of attacks can generally be obtained, and that in a not insignificant proportion of cases the attacks may be prevented for years without deterioration of general health.

Pershing does not, therefore, regard idiopathic epilepsy as merely a functional disorder of the brain, such as migraine, probably is, and still less as merely a toxic eclampsia, such as a uremic convulsion is, but as practically like organic epilepsy, in which the lesion is not progressive and is comparatively slight. And as it is beyond our power to remove the underlying cause of the cortical irritability, we do not expect, strictly speaking, to cure epilepsy. Even when an organic cause is known and is apparently removed by treatment, the attacks generally continue, and bromide must be given. This need not discourage us, Pershing says, provided we make the treatment as persistent as the disease, and keep fitting it to the individual patient.

The favorable cases for treatment are those in which the health is otherwise good, the attacks being of the major form only, beginning late rather than early in life, and the total number remaining small. Very frequent minor attacks, together with occasional major attacks, are especially unfavorable, and minor attacks alone are generally worse than major attacks alone.

The first essential to successful treatment is to tell the patient of the tendency to recurrence, even after apparent cure, and of the need of faithful continuous coöperation on his part. What should be understood

(3) Jour. Amer. Med. Ass'n., Sept. 15, 1917, p. 869.

and agreed to is that treatment must be extended over many years, perhaps over a lifetime even though the attacks are arrested. The prescription must be modified from time to time to fit it more exactly to the needs of the patient, but only by the physician, and it is never to be discontinued even for a day except by express order of the physician. Such an order should not be given unless the reason is overwhelming, as in some acute disease in which the bromide would be distinctly harmful.

The diet of the epileptic should be generous and varied, but he should learn to moderate his desire for excessive quantities of food. A written list of articles permitted and prohibited should be given. Those permitted should include the ordinary fresh meats, poultry, fish, eggs, cooked vegetables, cooked fruits, wheat bread, light cakes, tea and coffee.

In the list of prohibited things should be included oatmeal, cornmeal, bran bread, popcorn, hominy, most breakfast porridges, and, in general, the bulky foods that are so much recommended as laxatives. Nuts are especially harmful, and should be absolutely prohibited. Salt is to be restricted to a small amount; therefore salt meats are to be avoided. Certain raw fruits, especially apples and bananas, are dangerous. Pastry, heavy puddings, very rich dishes and unusual mixtures must be avoided. Alcohol and tobacco are not for the epileptic.

In giving bromide the aim, of course, is to find such a dose, so combined with other remedies, that attacks will be prevented and yet the patient not seriously suffer from its prolonged administration. Pershing's average beginning dose for an adult is 20 grains three times a day in a liquid mixture. If that prevents attacks, but bromism appears, the medicine is not interrupted at all, but reduced from 10 to 15 per cent. at a time, until a dose that can be tolerated is found. Toleration may be increased by adding about 10 minims of tincture of nux vomica to each dose and also by adding arsenic, preferably as sodium cacodylate, from 0.002 to 0.005 gm. (from 1/30 to 1/12 grain).

A laxative is often necessary, and the aromatic fluid-extract of cascara can be added to serve this purpose. If the amount of bromide is inadequate to restrain attacks, it is to be increased cautiously. When a dose is found which is sufficient and is well tolerated, it is to be continued for a long time and then cautiously reduced. Dropping from three doses a day to two of the same strength is too great a change to make at one time, but one might change from three doses of 20 grains to two of 25 grains.

In case the major attacks are held in check, but the minor ones remain as frequent as before, it will do little or no good to advance to large doses of bromide. Instead, from 5 to 10 minims of tincture of digitalis or half a grain of spartein added to each dose may be of distinct service. Or, if there is much nervous irritability, from 2 to 4 minims of the deodorized tincture of opium with a corresponding increase in the laxative may be better. Occasionally, especially of late years, Pershing has used small doses of thyroid with advantage, and some patients with low blood-pressure may profit by the addition of pituitary substance; but he has not tried the latter in this disease. If status epilepticus supervenes, instead of trying to control the convulsions by increasing the amount of bromide, one should keep this at the usual amount and give chloral in 15 grain doses every two hours, for the first few doses, or even every hour. If this does not quickly reduce the frequency of attacks, inhalations of chloroform should be used. If respiration is threatened, atrophine and strychnine should be given hypodermically in the usual doses.

[The author's views relative to diet are at variance with those of many observers who are of the opinion that the protein elements of food must be restricted and regulated, permitting only that quantity which is compatible with the absence of attacks and the freedom of urine from such split-off products as indican, indoxyl, etc.

The treatment of epilepsy is considered in the Prac-

tical Medicine Series, Vol. 10, 1916, p. 20; 1915, p. 37; 1914, p. 14.—ED.]

DYSTONIA MUSCULORUM DEFORMANS.

Dystonia Musculorum Deformans. In a paper upon the progressive torsion spasm of childhood (dystonia musculorum, deformans) J. Ramsay Hunt[4] says that, progressive torsion spasm is a disease of childhood first described by Ziehen, and with rare exceptions has been confined to descendants of Russian and Polish Jews. It is essentially a progressive torsion spasm of the trunk and extremities, often associated with hypotonia and sometimes with movements of a more clonic or rhythmic character, suggestive of chorea and athetosis. Tremor movements are occasionally noted. The characteristic feature is the twisting and tractile quality of the spasm with the attendant distortion of the trunk and extremities, and the bizarre disturbances of posture, gait and station. Sensation is intact, and there are no symptoms of pyramidal tract involvement. It is a progressive affection with a limited symptomatology, and may eventually become stationary.

Six cases of this curious disease have come under Hunt's observation.

He concludes that the progressive torsion spasm of childhood (dystonia musculorum progressiva) is a progressive organic affection of the central nervous system.

There is a gradual loss of a mechanism which is engaged in regulating and controlling tonus during the voluntary, automatic and reflex activities of muscles. As a result, there is a disturbance or loss of those reciprocal tonus activities of agonistic and antagonistic muscles which are a part of every complex or synergic movement. This, together with the loss of inhibition, he regards as the chief factors in the production of the motor disorder.

(4) Jour. Amer. Med. Ass'n., Nov. 11, 1916.

It is a definite disease, and, like such affections as paralysis agitans, double athetosis and dyssynergia cerebellaris progressiva, runs a progressive course and then remains stationary, other portions of the nervous system remaining unaffected.

It is closely related to athetosis and yet in its typical form is readily differentiated from this affection. Transition or combined forms probably occur.

It is essentially a disease of childhood, but has appeared as late as the seventeenth year.

The face and muscles of articulation are not affected except in the terminal stage, when there is involvement of the muscles of the neck. Such mild disturbances as have then been noted are probably of secondary origin.

With the characteristic torsion spasm there is usually but not always associated a not inconsiderable degree of hypotonia.

There may be a hemilateral involvement of the extremities which may exist as such for some years. A pseudo-paraplegic or paraplegic type may also occur.

The torsion movements continue, but are diminished during rest, and are greatly increased by any muscular activity, especially standing or walking; they cease entirely during sleep. Other disorders of motility, as tremor, chorea or athetosis, are frequently associated.

The trunk and lower extremities are chiefly affected, especially their proximal segments.

In the later stages, there is often a well-marked tendency to stereotypy or fixation in the distribution of the spasm, which predominates in certain muscle groups. In this stage, he has observed in the movements of the ankle, and less commonly of the wrist, a curious reversal of the normal manifestations of tonus which may be termed the paradoxical or reverse phenomenon of dystonia. When present it is, he believes, a pathognomonic symptom.

The affection varies considerably in the degree of motor unrest and agitation which is produced. This may occasionally assume sudden and violent propor-

tions requiring strong sedatives and reducing the patient to a dangerous state of exhaustion. It may occasionally constitute an agitated form or stage of the disease. The affection is progressive and incurable and, with few exceptions, has appeared only in descendants of Russian and Polish Jews.

[Although classified as a neurosis it may be recalled that this disease is included by many as one of a number of diseases due to a disturbance of tone and associated as such with the amyostatic syndrome of Strümpel.—Ed.]

THE CEREBROSPINAL FLUID AND DISEASES OF THE MENINGES.

The Possible Functions of the Cerebrospinal Fluid. Dwelling upon the subject from the physiologic standpoint, W. D. Halliburton[1] reviews the functions of the cerebrospinal fluid. He states that it fulfills certain mechanical functions of support and pressure, yet feels that this does not explain why ordinary lymph would not do as well, as in the majority of other organs. It is quite possible, he says, that the secretory pressure of the chorioidal secreting cells may come into play in maintaining, equalizing and adjusting those pressure relationships which are most advantageous for the wellbeing and functioning of the spinal cord and brain. The cerebrospinal fluid plays the part undertaken by the lymph in other districts of the body and must be the intermediary medium which is traversed by the oxygen on its way from the blood to the tissue elements. Furthermore, it must be the vehicle by which other nutriment reaches the cells and fibers of nervous tissue.

The view Halliburton has been led to take is—the nervous mechanism being so sensitive, so easily influenced by anything unsual—that, therefore, the neurones must be bathed in a highly physiologic cell solution to maintain their osmotic equilibrium.

(1) Brain, October, 1916, p. 213.

A New Mastic Test for the Spinal Fluid. Emmanuel's mastic reaction is modified by James A. Cutting[2] as follows:

A stock mastic solution is made by dissolving 10 gm. of gum mastic in 100 c.c. of absolute alcohol, and then filtering. This stock solution keeps indefinitely if well corked. To 2 c.c. of this solution 18 c.c. of absolute alcohol are added, and insufflated rapidly into 80 c.c. of distilled water. This makes an emulsion of mastic which is opalescent when held to the light. This solution can be used immediately or after several days; indeed, the reactions seem to be more easily read when a solution is employed which has stood for at least a few hours.

Next, a 1.25 per cent. sodium chloride solution is made with distilled water, and to each 99 c.c. of this salt solution is added 1 c.c. of a 0.5 per cent. solution of potassium carbonate made up with distilled water.

Then six small test tubes, such as are regularly used in the Wassermann tests, or more if desired, are placed in a rack. To the first tube, 1.5 c.c. of the combined salt and potassium carbonate solutions are added, and to the other 1 c.c. each. Then 0.5 c.c. of spinal fluid is added to the first, and after thorough mixing 1 c.c. is transferred from the first to the second, 1 c.c. from the second to the third, and so on, the last cubic centimeter that remains over from the next to the last tube being thrown out, and no spinal fluid being put in the control. Now to each tube 1 c.c. of the mastic solution is added and stirred thoroughly with a glass rod, care being taken to wash the rod with distilled water before going to the next series. It is best to finish each group before beginning another.

The racks are set away, and in from twelve to twenty-four hours the end-results can be read. If the racks are placed in an incubator at 37.5° C., the precipitation is complete in from six to twelve hours. A yet more rapid method, he finds, is to incubate for two hours and then centrifugalize, in which case even the mastic will be precipitated in the positive tubes.

(2) Jour. Amer. Med. Ass'n., June 16, 1917, p. 1810.

He finds that the mastic reaction parallels quite closely the colloidal gold reaction, and is more easily interpreted and much more easily and quickly performed.

In eighty-four cases of syphilis of the nervous system, the mastic test was uniformly positive.

Puncture Headache. The term "puncture headache" has become a colloquialism in the hospitals. It is not a serious condition, and it lasts but a short time, but it is a distinctively new thing in pathogenesis and neurology. Charles L. Dana[3] says that the headache rarely begins until the day following the puncture, when the patient usually is allowed to get up. The pain may be accompanied with nausea and even violent vomiting, and also with some giddiness, mental confusion and faintness.

The condition lasts with remissions for from five or six days to two or three weeks. When the trouble lasts and is obstinate, there is an accompanying cerebral dysthesia and sense of confusion or dizziness, which may cause worry and alarm.

The symptom is more common in patients whose cerebrospinal fluid is negative, and in whom the fluid comes out under low pressure. In acute conditions like poliomyelitis and meningitis, in which there is high pressure, puncture often relieves headache, especially in children. Dana supposes that the changes in pressure caused by puncture and removal of fluid take away the water pad of the brain, so that it rests unprotected on the bone, causing an irritation of the dural fibers of the fifth and occipital nerves.

Is it not possible, he asks, that a good many headaches are due to defective action of the chorioid gland, to an imperfect cerebrospinal fluid circulation?

Lumbar Puncture. It is the conviction of Newmark and Beerman[4] that lumbar puncture may occasionally produce much more serious results than is generally believed. Although it is well known that brain tumor cases are unsuitable for lumbar puncture, it is not so

(3) Jour. Amer. Med. Ass'n., April 7, 1917, p. 1017.
(4) Med. Record, April 28, 1917.

generally known that when the tumor is intraspinal the effect of the puncture may be increased pressure on the cord. In two of their cases of spinal cord tumor paresis of one of the extremities was converted into a complete paralysis of both legs in one, and complete paralysis of one leg, paresis of the other and anesthesia in the other case.

The Colloidal Gold Reaction of the Cerebrospinal Fluid in Acute Poliomyelitis. Of great interest is the report of Lloyd D. Felton and Kenneth F. Maxcy,[5] who say that:

1. In the acute stage of poliomyelitis, the spinal fluid reacts with colloidal gold in dilutions of from 1:40 to 1:160, producing a maximal decoloration of 3 ("blue").

2. In the second and third weeks the reaction is practically the same as in the acute stage, with a tendency to clear up in some cases and a precipitation in the higher dilutions in others. There is no constant rule.

3. From the fourth to the eighth week the colloidal gold reaction runs practically to the globulin-albumin content, persisting in some cases to the eighth week and beyond, but still occurring in dilutions of from 1:40 to 1:160.

4. As the spinal fluid in acute poliomyelitis reacts constantly in the same zone, the gold chloride reaction is helpful in the diagnosis of this disease.

5. They deem it advisable to use the following nomenclature in reading the reactions of Lang's colloidal gold test:

(*a*) Zone 1 or (paretic zone), maximum precipitation from 1:10 to 1:160, with complete decolorization.

(*b*) Zone 2, maximum precipitation from 1:40 to 1:160, with decolorization up to 4 (light blue).

(*c*) Zone 3, maximum precipitation beyond 1:160.

Cerebrospinal Fluid Pressure. A. L. Skoog[6] finds that the normal pressure in the normal person taken in the sitting posture with head bent forward ranges

(5) Jour. Amer. Med. Ass'n., March 10, 1917, p. 752.
(6) Ibid., Sept. 29, 1917, p. 1064.

from 90 to 150 mm. of water. In searching the literature a wide range of differences for the normal pressure is found.

A great number of pathologic states involving the brain, spinal cord, and their membranes will produce alterations of tension of the subarachnoid fluid. States with increased pressure exceed tremendously those with decreased pressure.

In Skoog's experience, brain tumor cases have furnished the highest pressures, often registering from 620 to 700 mm. and more. There have been reported pressures reaching 1,000 mm., but these are rarely encountered. Much caution should be exercised in lowering the pressure when high figures are registered.

Tuberculous meningitis gives an exceptionally high pressure, but does not reach that of the tumors. All forms of syphilis of the central nervous system, including tabes and general paresis, furnish high pressures ranging from 250 to 400 mm. Paresis and secondary or tertiary meningitis supply the higher figures.

Hydrocephalus, if the intracranial pressure has not prevented an outflow, causes a greatly increased spinal fluid tension. In a number of the chronic degenerative neural diseases there are moderately increased pressures.

All the acute meningitis cases will show a sharp rise in the spinal fluid pressure. Acute poliomyelitis, rabies, tetanus, several intoxications and alcoholic delirium furnish somewhat increased pressures, usually about 200 to 300 mm.

Head traumas and particularly brain hemorrhages will provoke a considerable increase in the spinal pressure.

The most frequent causes for real, pathologically low pressures are inflammation of the spinal cord preventing patency of the subarachnoid space and the flow of fluid to the lumbosacral cistern. A spinal cord neoplasm or cyst may cause a similar condition. When a tumor of sufficient size is pressing on the cord, the manometer may show only a few millimeters' pressure (about 20 to 40 mm.). After the removal of from 1

to 5 c.c. of the spinal fluid by lumbar puncture, this low pressure promptly drops to *nil*.

The Significance of Xanthochromia of the Cerebrospinal Fluid. Attention is called by T. P. Sprunt and J. E. Walker[7] to the clear, yellow spinal fluids occasionally observed at lumbar puncture. Their remarks are based on five cases observed and reported and an analysis of 100 cases from the literature.

The fluids may be divided into two main groups:

1. Those in which the color is due to dissolved hemoglobin or its derivatives, and which as a rule do not coagulate spontaneously and contain only a small amount of globulin. Such fluids usually are associated with brain tumors in contact with the meninges or ventricles.

2. The larger and more important group comprises those cases showing the so-called Froin's syndrome, in which the fluid is transparently clear, yellow, coagulates spontaneously, contains large amounts of globulin, may or may not show pleocytosis, and gives no positive tests for hemoglobin.

This is a "compression syndrome," its main determinants being the isolation of a lumbar cul-de-sac, in which the spinal fluid stagnates, and probably some vascular changes within its walls.

Clinically, with negative *x*-ray of the vertebral column, it is strongly suggestive of a tumor of the spinal cord, although it may also be associated with intradural inflammatory processes.

Spinal Fluid Findings Characteristic of Cord Compression. The findings in twelve cases are presented by James B. Ayer and Harry R. Viets;[8] all the patients were known to one or both of the writers, either from the laboratory or the clinical side, and usually from both points of view. All showed the spinal fluid compression syndrome in its complete or incomplete form, and in all the authors have proof of cord compression, either from operation or necropsy, in one case only

(7) Bull. Johns Hopkins Hosp., February, 1917.
(8) Jour. Amer. Med. Ass'n., Dec. 9, 1916, p. 1707.

resting their proof on a combination of clinical and Roentgen-ray evidence.

From a survey of the literature the authors state:

1. Abnormal findings in the cerebrospinal fluid in cases of cord compression were first noted by Froin in 1903. Since that date over fifty cases have been reported, mostly in the French and German literature.

2. The original syndrome of Froin consisted of xanthochromia, spontaneous coagulation with increase in the cell count. Other workers have shown that compression is also indicated by a low cell count, marked increase in protein content, with or without xanthochromia (Nonne and Raven).

3. The cause of compression may be tumors, Pott's disease, circumscribed meningitis, meningomyelitis, or any pathologic process causing complete or partial transverse myelitis from pressure, within or outside of the cord.

4. Compression may be exerted at any point on the spinal cord, but in the majority of the cases reported it was in the lumbar region or the conus terminalis.

5. The pathologic fluid was found only distal to the point of compression.

6. The cause of these findings is not known. It seems certain that in all of the cases reported there was the formation of a cul-de-sac below the point of compression and it is in this walled-off space that the abnormal spinal fluid is found.

The authors conclude that pressure sufficient to cause marked sensory and motor disturbance tends to give the complete spinal fluid syndrome. In their cases, compression from acute processes was more potent in the production of yellow fluids than that from chronic causes, and, lastly, it seems that intramedullary and meningitic lesions, especially when surrounding the cord completely, are more productive of the complete syndrome than are extradural processes.

They believe that changes in the spinal fluid frequently occur as a result of compression of the spinal cord. The principal characteristic of such compression fluid is marked increase of proteins without cor-

responding cellular increase, obtained under normal pressure. Xanthochromia with massive coagulation added to the above makes a more intense reaction of the same significance, only more conclusive. Factors which tend to give the syndrome most readily, or to give it in its most intense form, are processes which act rapidly, are intramedullary or cause pressure on the cord from all sides, and which affect the lower cord. They do not believe that such findings are necessary in cord compression, but that their presence is confirmatory evidence, of value in some cases.

[Reference to xanthochromia may be found in the Practical Medicine Series, Vol. 10, 1913, p. 6, and 1916, p. 36.—ED.]

MENINGITIS.

Meningitis Associated with Gram-Positive Bacilli of Diphtheroid Type. Meningitis associated with Gram-positive bacilli of diphtheroid type is reported by Everett Atkinson.[9] Five cases of meningitis occurred almost in the nature of an epidemic among children ranging between the ages of 2 and 9 years. The cases suggested strongly epidemic cerebrospinal meningitis. One patient recovered completely.

No meningococci were discovered in the cerebrospinal fluid in any of these cases. A Gram-positive bacillus of diphtheroid type was found in each case. No other organism was seen, either in direct films of centrifuged deposit, or on cultivation.

In some of these cases the diversity of forms assumed by the bacillus was very marked; in two cases forms staining Gram-negative and indistinguishable from diplococci were seen in films made from a single colony, and these occurred in association with the involution forms of extraordinary complexity and variety, of a Gram-positive bacillus of diphtheroid type.

(9) Med. Jour. of Austral., Feb. 10, 1917, p. 115.

Influenza Meningitis. A case of influenza meningitis is reported by W. Tobler.[1] Upon autopsy it was found that the meninges had become infected through the cribriform plate of the ethmoid bone from the nose. The peritoneum was secondarily infected, probably by the hematogenous route. It is of interest to note that this patient had congenital lues and Tobler makes the point that there are many indications to show that congenital lues lowers the resistance of the individual and renders an infection particularly virulent. He gives a rather complete bibliography of interesting cases which have been reported by Slawyck, Fraenkel, Jundell and others.

Acute Syphilitic Meningitis. Acute syphilitic meningitis may be regarded, according to S. A. K. Wilson and A. C. E. Gray,[2] as appearing under three phases or at three periods in the course of syphilis.

1. It may occur as an acute exacerbation in cases of congenital syphilis.

2. It may develop during the secondary period, either with or very soon after the cutaneous exanthem, or even at a preroseolar stage.

3. It may be an episode in the tertiary stage, arising in the course of a chronic gummatous syphilis, long after infection, and sometimes when the lesions in the nervous system have appeared to be latent or quiescent.

In the first and third of these, the meningeal syndrome occurs along with other symptoms or signs of syphilis, whereas in the second the clinician may be faced with the picture of an acute meningitis *per se*, and he must depend for his diagnosis on the history, or an examination of the cerebrospinal fluid, or on certain variations in the clinical symptom-complex.

The author's case was that of a previously healthy young man of 24 who contracted syphilis and was treated systematically without delay by accepted methods. The Wassermann reaction was positive in the blood; apparently no secondaries developed. In less than two months the reaction was negative, and

(1) Corr.-Bl. f. Schweiz. Aertze, July 14, 1917, p. 881.
(2) Brit. Med. Jour., Sept. 29, 1917, p. 419.

the patient felt perfectly well. Almost exactly three months after the infection he suddenly began to suffer from severe headaches, and in the course of a few days developed the characteristic symptoms of acute meningitis. The case was diagnosed as cerebrospinal meningitis, and was treated for a week with antimeningococcus serum in full doses. Doubts were cast on the diagnosis by the course the disease pursued and by the cytologic findings in the fluid, as well as by a consideration of the history of the case. On the eighth day after admission syphilitic meningitis was diagnosed and the fluid subjected to the Wassermann test, which was, however, reported as negative. A fortnight later both in blood and fluid the Wassermann test was found to be strongly positive, and by energetic treatment with mercuralized serum and mercurial inunction the patient made uninterrupted progress to complete recovery. He was discharged cured not quite four months after admission.

[Reference to syphilitic affections of the meninges may be found in Practical Medicine Series, Vol. X, 1914, p. 18.—ED.]

Circumscribed Cystic Spinal Meningitis. A case of cyst of the spinal pia causing symptoms of compression of the cord with successful operation is reported by Hanes and Willis.[3] Following operation, the improvement of the condition of the patient was immediate and remarkable. The explanation of cystic meningitis given by these authors is that as the result of either septic or aseptic inflammatory processes the leptomeninges form adhesions which may produce single or multiple cysts. They acknowledge the possibility of trauma as a cause, and believe that by the production of small hemorrhagic effusions into the leptomeninges toxic inflammation is produced with consequent adhesions. The walls of these cysts are so delicate that if the cyst should be punctured in opening the dura one could readily understand that the condition might not be recognized.

In this case, lumbar puncture revealed a fluid which

(3) Amer. Jour. Med. Sci., December, 1916, p. 859.

had a distinctly yellow tinge, a cell count of three lymphocytes to the cubic millimeter, and marked excess of protein material by the Noguchi globulin reaction.

Notes on the Standardization and Administration of Antimeningococcus Serum. A critical examination of the results of the tests performed by Harold L. Amoss[4] brings out points both interesting and practically of high importance.

A practical standard for the serum should include two requirements. The first should define the physical qualities of the product which are acceptable. This definition should include absence of more than a trace of hemoglobin, color of straw yellow to amber, perfect clearness or, if slightly turbid, clearing on standing for twelve hours. As regards the preservative, tricresol is to be preferred, and the strength should not exceed 0.35 per cent. and may safely be reduced to 0.2 per cent. provided due care is exercised in collecting and bottling the serum.

Next, the employment of dark glass containers should be prohibited. The container, whether bottle or syringe, should be of clear white glass, and the labels arranged so as to permit of inspection of the contents from without. The containers should be wrapped in blue paper or otherwise enclosed so as to exclude the actinic rays of light.

Finally, the agglutination titer for each of the four type cultures should be from 1:400 to 1:1,000, as determined by the macroscopic method after incubation at 55° C. for sixteen hours (over night).

As the result of a somewhat extensive experience with the clinical administration of the serum, Amoss directs attention to a few points of value. While the temperature remains high and meningococci are still present in the cerebrospinal fluid, injections every twelve hours, except in very young babies, should be resorted to unless clinical indications to the contrary exist. The next interval between injections should be twenty-four hours, then forty-eight hours. Subsidence

(4) Jour. Amer. Med. Ass'n., Oct. 6, 1917, p. 1137.

of high temperature, clearing of cerebrospinal fluid with disappearance of the meningococcus, and general improvement in the condition of the patient, are the indices for moderating the energy of the treatment.

The position of the patient is of moment. In order to distribute the serum over the surface of the brain and into the lateral ventricles after the intraspinal injection, the foot of the bed should be raised from 8 to 12 inches and kept so for six hours if possible. Sometimes the headache resulting from this position may make it expedient to return the bed to the normal position. At the end of six hours, the foot of the bed is lowered to its original position, and the other end raised until the time for the next lumbar puncture. During this time, the turbid fluid or pus is collected in the lower part of the spinal canal to be drawn off at the next puncture.

In addition to treating all cases of intraspinal injection of the serum, it is advisable to administer one or more doses intravenously in fulminant or very severe cases, or cases in which there are numerous skin hemorrhages. The quantity thus injected should be from 50 to 100 c.c., depending on the age of the patient and the severity of the infection.

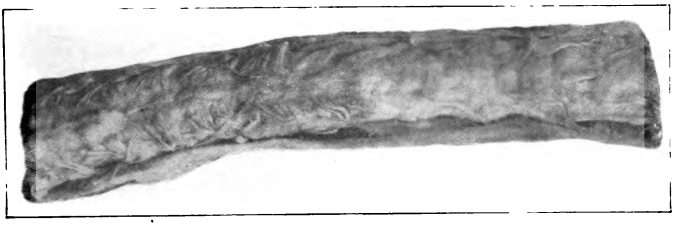
Ventricular puncture and injection of serum into both lateral ventricles should not be delayed when symptoms of cranial involvement remain after the spinal fluid is almost normal.

Diffuse Sarcoma of the Pia Enveloping Entire Cord. This case which belongs to a well-known group in which in addition to diffuse sarcoma of the spinal pia there exists a definite larger tumor in the posterior cranial fossa is reported by Peter Bassoe and C. L. Shields.[5]

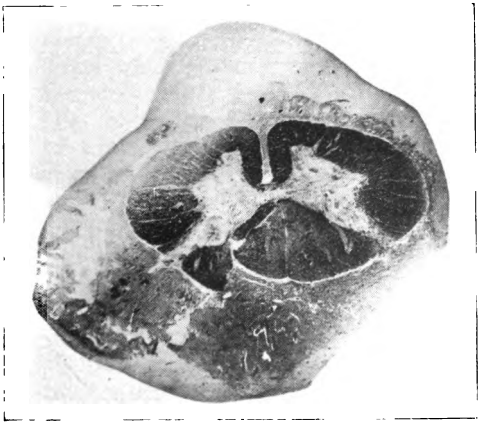
The patient, a girl 16 years old, was admitted to the Presbyterian Hospital, Chicago, on Dec. 3, 1910. Aside from a few attacks of tonsillitis she had been in good health until March, 1910, when she had an attack of headache, vomiting, and dizziness lasting one week. Following this, she was well for a month,

(5) Jour. Nerv. and Ment. Dis., November, 1916, p. 385.

PLATE II.



Gross appearance showing diffuse sarcomatous infiltration of pia in which roots are imbeded.



Lumbar cord showing sarcoma of pia encircling it. Greatest thickness posteriorly—Bassoe and Shields, page 64.

and then had a second and similar attack, also lasting one week. In May, vision began to fail so that she had to give up her school work. In June there were two weeks of strabismus, the left eye being at fault, and the mother thinks it deviated outward. She could see a little until the day of admittance to the hospital when she became completely blind.

Hearing in the right ear had been impaired for two years (never discharge), and two weeks before admittance she became very deaf in both ears and complained of noises in the ears. From the beginning of July to the middle of November she was almost entirely free from headache and vomiting, but during two weeks preceding admittance to the hospital these symptoms returned and she gradually became stuporous. A few hours before starting for the hospital she breathed irregularly and the extremities became cold; she was thought to be dying, but she rallied in a few minutes.

Condition on Admittance: The patient was lying quietly in bed sleeping and could only be aroused with difficulty. She could hear when spoken to loudly, but seemed to be totally blind. The neck was stiff; otherwise, the muscles were completely flaccid. Kernig's sign was absent. All tendon reflexes were absent. Abdominal and plantar reflexes were normal. The pupils were equal, dilated, and reacted fairly well; there was conjugate deviation of the eyes to the right; bilateral optic atrophy, more marked in the right eye, probably secondary. No paralysis could be made out.

Course of Disease: On December 14, the patient had an attack in which she straightened out, with eyes rolled backward, and breathing became stertorous. The left eye was closed and the mouth was drawn a little to the left. The extremities were rigid but no definite paralysis could be demonstrated. The attack lasted about ten minutes.

After a few days she improved materially and became quite bright. She said she could hear the watch on contact, but the noises in the head prevented her from hearing people's voices. The tendon reflexes

were persistently absent and the eyes were generally turned to the right. The urine at first contained albumin and numerous hyalin, granular and epithelial casts. Later it was normal.

On December 24, there was an attack of left-sided convulsions lasting fifteen minutes. Other convulsions occurred on December 26, 30, 31 and January 1. On January 1 the breathing became of the Cheyne-Stokes' type and on January 4 cyanosis set in and the patient died.

The necropsy was held a few hours after death.

Anatomic diagnosis: Diffuse tumor of the pia of the cord and bulb (endothelioma?). Tumor of pia of cerebellum; edema and hypostatic hyperemia of the lungs; slight healed aortic and mitral endocarditis; passive hyperèmia of the liver and kidneys; chronic catarrhal bronchitis; chronic follicular tonsillitis; sordes of the tongue; small follicular ovarian cysts. The entire posterior surface of the cord is coated by a greyish-white tissue infiltrating the pia, in which the roots are imbedded. Cross sections show the greatest thickness of the tumor to be in the median line while it tapers toward either lateral border, as will be seen in any picture of a cross section of the cord. Its greatest thickness, at the seventh thoracic segment, is 7 mm. From here is decreases upward to the first thoracic, where it measures 1.5 mm., and then again increases to the first cervical, where it is 6 mm. thick. At the latter level it extends as a distinct growth around the posterior two thirds, but in the anterior third it only can be recognized microscopically as a ribbon of cells along the pial surface. The tumor is continuous to the very end of the filum terminale. Nothing suggestive of glia is seen in the pial tumor, the structure of which is best described as round-celled alveolar sarcoma, though the alveolar feature is not marked.

The authors add that in this instance the only large tumor rested on the cerebellum and had the structure of a sarcoma arising from the meninges. Its size and more mature structure marked it as antedating the much more cellular diffuse cord tumor; and the early

symptoms—headache, vomiting, dizziness and failing vision—can be explained by the presence of this tumor. Presumably a rapid dissemination along the pial surface took place later. The evolution of symptoms in this case, together with the lymphocytosis and increased globulin content of the spinal fluid led to a tentative clinical diagnosis of tubercle of the cerebellum and secondary tuberculous meningitis, an error not uncommonly recorded in the literature of cases of this kind (Plate II).

The Diagnostic, Prognostic and Therapeutic Value of Lumbar Puncture in Spinal Injuries. Harold Neuhof[6] points out the cases in which the presence of blood may be of unusually great value as indication of the existence of spinal injury.

1. Suspected spinal injury in individuals suffering from acute or subacute alcoholism.
2. Suspected injury in patients in coma or in confused mental states.
3. Injuries suspected in cases of hysteria.

The procedure should be employed in every recent spinal injury sufficient to lead to the suspicion of injury to the spinal cord or its membranes. Furthermore, it may prove to have definite therapeutic value.

Notes on Gold Sol Diagnostic Work in Neurosyphilis. The results obtained by H. C. Solomon and E. E. Southard[7] seem to lend further strength to the idea of the chemical differentiation of different parts of the cerebrospinal fluid system. They have had some instances of fluids withdrawn in the process of intracranial salvarsan treatment simultaneously from the pial spaces and from the ventricles, which have likewise shown a difference in gold sol reaction, as also a difference in the Wassermann reaction and in other chemical tests. They regard as established the idea of the chemical differentiation under different conditions of disease of the ventricular fluid and the pial fluid. Of course the conditions of disease are such (what with the gluing together of membranes by exu-

(6) Archiv. Diagnosis, April, 1917, p. 193.
(7) Jour. Nerv. and Ment. Dis., March, 1917, p. 230.

date, and the local fibrosis) that it would not be unlikely that a compartmental situation would develop even if the entire fluid system were freely anastomotic under normal conditions. They have collected authorities on both sides of this question, as to the free intercommunication of fluid in different parts of the cerebrospinal fluid system. There are excellent opinions on both sides of the question, even when that question touches normal conditions. It would seem, however, that not much doubt should attach to the assumption of compartmental conditions in a disease like general paresis. They have occasionally found differences in the gold sol test from sub-pial spaces in coördinate parts of the pial membrane on the two sides.

SYPHILITIC DISEASES OF THE NERVOUS SYSTEM.

The Oculocardiac Reflex in Syphilis of the Central Nervous System. In the normal individual, pressure on the eyeball causes a slowing of the pulse rate through vagus inhibition. This inhibitory influence is likewise shown through action on various sensory nerves or surfaces.

E. Murray Auer[1] states that abolition of the oculocardiac reflex is among the earliest signs of syphilitic disease of the central nervous system and one of easy diagnostic practicability to the general practitioner. The oculocardiac reflex was abolished on the side exhibiting the hemianalgesia with preserved tactile sensation in a case presenting the Millard-Gubler syndrome. In only one case of well-marked tabes with cervical involvement in which pressure on the eyeball and testes was not painful was there evidence of diminished or disturbed superficial sensation other than in the case mentioned above.

In 52 per cent. of the cases studied, the pulse rate ranged from 82 to 112, and the increased rate occurred

(1) Jour. Amer. Med. Ass'n., March 24, 1917.

chiefly among the well-marked paretics. In third nerve palsy, the ptosis can sometimes be overcome by the patient re-inforcing the ptotic lid by forcibly holding the lids of the sound eye closed. During the paroxysms of spasmodic weeping, occurring in pseudo-bulbar palsy, the radial pulse is practically imperceptible at the wrist, showing a reflex inhibition of the heart beat.

Treatment of Cerebrospinal Syphilis with Report of Cases. In this report L. W. Grove[2] includes all tabes or syphilis of the nervous system; namely, general paresis, taboparesis, tabes and localized lesions formerly designated "cerebrospinal syphilis." Both salvarsan and mercurialized serum were used. He feels that little is to be hoped from treatment in advanced cases and that there is strong evidence to show that injurious effects might come from large doses of antisyphilitic agents given intradurally. Out of nine cases of paresis, three patients have been discharged clinically well with a negative or slightly positive spinal fluid. Two have been much improved but with spinal fluid still positive. Four have not improved.

[As is true of many reports, there is no specific statement as to the number of injections given to patients who have been treated in many of the instances. Where the treatment is detailed the number of injections has been surprisingly few.—Ed.]

Observations on Types of Response in Treatment of Syphilis of the Central Nervous System. In this presentation by Homer F. Swift[3] the following groups are recognized:

1. Early Manifestations:

(*a*) Cases which respond readily to the general administration of salvarsan and mercury.

(*b*) Cases which respond more slowly to salvarsan intravenously and tend to relapse when salvarsan is discontinued or mercury is substituted.

(*c*) Cases which do not clear up under most intensive general treatment, but which respond satisfactorily to intraspinal treatment.

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(2) Amer. Jour. Insanity, October, 1916, p. 253.
(3) Amer. Jour. Syphilis, July, 1917, p. 524.

2. Later Forms of Central Nervous Syphilis of the Exudative Type:

The abnormal elements in the cerebrospinal fluid usually disappear rapidly under the general administration of iodides, mercury and salvarsan.

3. Tabes Dorsalis.

(*a*) Cases which show a rapid response to general treatment.

(*b*) Cases which show no improvement or very slow improvement under general treatment.

(*c*) Cases which show a satisfactory response to intraspinal treatment alone.

(*d*) Cases which have responded slowly to general treatment alone, but which respond more rapidly when intraspinal injections of "auto-salvarsanized serum" are given.

(*e*) Cases which relapse when treatment is discontinued.

(*f*) Cases which continue to improve when treatment is discontinued.

4. Paralytic Dementia.

(*a*) Cases with marked improvement in both clinical signs and the condition of the cerebrospinal fluid.

(*b*) Cases with marked clinical improvement but no change in the cerebrospinal fluid.

(*c*) Cases with a progressive downward clinical course and stationary condition of the cerebrospinal fluid.

5. Cases Clinically not Paralytic Dementia in Which the Cerebrospinal Fluid Shows a Paretic Type of Gold Curve.

(*a*) Cases which respond rapidly to combined intravenous and intraspinal treatment.

(*b*) Cases which respond more slowly and show a decided tending for the abnormal elements to recur when treatment is discontinued.

In conclusion, he says that in general the lesions due to inflammation or exudation are much improved or eliminated by the general treatment of the patient. Those due to degeneration are little if any affected. Treatment should be directed not only toward the

elimination of symptoms but toward the elimination of the underlying process; namely, syphilis. In most patients with early meningitis and in those with what was formerly termed "tertiary syphilis of the central nervous system" the symptoms due to exudation respond in a satisfactory manner to the general administration of salvarsan, mercury and potassium iodide. Occasionally a case is seen in which intraspinal treatment seems to be necessary in order to eradicate completely the central nervous lesions. Likewise, in tabes dorsalis many patients respond satisfactorily to the general administration of salvarsan and mercury. On the other hand, in a considerable number of tabetics the addition of intraspinal injections of serum to intravenous treatment of salvarsan seems to hasten the elimination of abnormal elements in the cerebrospinal fluid and lead to a permanent arrest of the degeneration.

It is advisable to continue the treatment of patients suffering with cerebrospinal syphilis or tabes dorsalis until the cerebrospinal fluid is normal and remains so. A possible exception may be made in reference to excess globulin, for an increased globulin is not infrequently found years after all other abnormal elements have disappeared from the fluid.

In paralytica dementia, while much benefit may be expected in increasing the number and length of remissions, the ultimate hope for recovery is slight.

Treatment of Syphilis of the Central Nervous System. In a comparison of mercurialized serum and salvarsanized serum David A. Haller[4] states that the irritating effect in the spinal canal of serum to which mercuric chloride has been added in the dose of 0.001 gm. is greater than that of 20 c.c. of salvarsanized serum separated from blood drawn thirty minutes after a dose of 0.6 gm. of salvarsan.

The average effect on the laboratory findings in the spinal fluid from one dose of mercurialized serum is greater than from one dose of salvarsanized serum.

Unpleasant symptoms are more common following

(4) Archiv. Int. Med., June, 1917, p. 997.

intraspinal mercurialized serum than following salvarsanized serum.

The greater irritation of the meninges from mercurialized serum prevents as rapid repetition of dosage as is possible with salvarsanized serum.

Cases of general paresis, meningitis and cerebrospinal syphilis stand intraspinal treatment with mercurialized serum better than do cases of tabes dorsalis. It is particularly in cases of active syphilis of the meninges that the mercurialized serum is useful.

Mercurialized serum has an advantage over salvarsanized serum in ease of preparation and in its keeping qualities. For these reasons, it can be used under clinical conditions in which the use of salvarsanized serum is impossible, or at least very much more difficult.

Eleven patients previously treated with salvarsanized serum were each given three or more intraspinal treatments with mercurialized serum, a total of thirty-eight doses. The effect on the Wassermann reaction, cell count and clinical symptoms was in every case equally as good as, if not better than, from the same amount of salvarsanized serum. The reactions in every case were more severe than with the salvarsanized serum.

Treatment of Syphilis of the Central Nervous System with Intraspinal Injections of Mercurialized Serum. Julian Mast Wolfsohn[5] reports one case of Erb's syphilitic spastic spinal paralysis, and four of tabes dorsalis out of a total of twenty-five cases treated in this manner. He states in favor of this method of treatment that there is no danger in its administration; that for local treatment it is very efficacious in syphilis of the central nervous system, especially in tabes dorsalis, in which lancinating pains are the predominant symptom; that, due to its stability, the serum may be used at any time after its preparation; that it is inexpensive, and that there is no objection to a combined salvarsanized and mercurialized treatment.

Because of the short space of time that has elapsed

(5) Amer. Jour. Med. Sci., February, 1917.

since the beginning of this form of treatment, it must not be concluded that relief is going to be permanent. Such a conclusion can not be justified until at least three years have elapsed. The results obtained so far show that it mitigates pain.

Treatment of Paresis by Injections of Salvarsan into the Lateral Ventricle. The harmlessness of the operation and the excellent results so far obtained lead Graeme M. Hammond, Norman Sharpe and J. Wheeler Smith[6] to urge that this form of treatment be universally adopted in the early stages of the disease.

The blood serums, the cerebral fluids and the spinal fluids of eleven patients with paresis undergoing intraventricular treatment with neosalvarsanized or salvarsanized serum were examined at irregular intervals, before treatment, after the first treatment, after the second treatment and after the third treatment. Some patients have been examined since, after a lapse of from four to eight months. The fluid changes were either *nil* or so slight as to be negligible in most instances.

The Treatment of Paretic Dementia. Two and a half years have elapsed since B. D. Evans and F. H. Thorne[7] began to treat patients suffering from paretic dementia by the intraspinal method. During this period they have treated twenty-three patients intraspinously with salvarsan, neosalvarsan, and albuminate of mercury.

The smallest number of injections given to one patient was three and the largest number twenty. The Wassermann reaction was temporarily reduced to negative with the blood serum of one patient and with the cerebrospinal fluid of three. Three patients showed some mental and physical improvement; ten died, four during the course of treatment and six several months after the treatments were discontinued; ten are living and are markedly demented. The authors have found that the intraspinous method of treating paretic dementia has had little or no therapeutic value in their series of cases.

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(6) Jour. Amer. Med. Ass'n., July 7, 1917, p. 23.
(7) New York Med. Jour., Sept. 8, 1917, p. 437.

Treatment of General Paresis. In reviewing his work on the treatment of general paresis, Hanson S. Ogilvie[8] discusses the rationale of the Swift-Ellis method of treatment. In order to support his view, he quotes Young who found that the serum and salvarsan form a colloidal combination, and that the salvarsanized serum could not be dialyzed through a collodion membrane, although salvarsan alone is dialyzable. This proves that the two substances unite to form a third, the chemo-biologic and curative properties of which have further been shown to differ essentially from those of either of the originals.

[Inasmuch as one of the chief objections to therapy with salvarsan has been the large molecular formation of the drug and its colloidal properties, it seems paradoxical to form from a dialyzable agent one which does not dialyze in order to increase its efficiency.—ED.]

Truth About Intraspinal Injections in Treatment of Syphilis of Nervous System. According to B. Sachs,[9] intraspinal injection of salvarsanized serum or serum plus salvarsan in the treatment of syphilis of the nervous system is a form of antisyphilitic medication which has exercised a curious fascination over the medical man during the past few years and has gained a large number of adherents among the general medical public.

The present-day aim of specific therapy is to bring the spirocheticidal remedy, if possible, into immediate contact with the foci of disease in the tissues of the brain, the spinal cord and their coverings.

His clinical experience taught him some years ago that the intravenous injection of salvarsan or neosalvarsan produced results that were entirely satisfactory and that were at least comparable with those obtained by intraspinal medication. The older doctrine, therefore, that the chorioid plexus is impermeable and that salvarsan introduced intravenously cannot be expected to reach the cerebral or spinal tissues had to be abandoned.

(8) Amer. Jour. Syphilis, July, 1917, p. 509.
(9) Jour. Amer. Med. Ass'n., Sept. 1, 1917, p. 681.

All recent physiologic experiments appear to show that metallic substances introduced into the cerebrospinal fluid are not retained, but passed into the venous system, and, furthermore, that certain substances coursing in the blood may pass through the chorioid plexus into the cerebrospinal fluid by way of the capillary vessels.

As for the remarkable reduction in the number of the lymphocytes and the change in Wassermann reaction claimed as a result of the intraspinal method, Sachs asserts, and the truth, he says, is already known to many, that the same changes have followed on intravenous injections, pure and simple, on repeated lumbar punctures, and on the introduction of the patient's non-salvarsanized serum.

His impressions, based on experience of the actual achievements by the intravenous injection of salvarsan, are as follows:

The best results are obtained in the cases of cerebrospinal syphilis that are either distinctly vascular in origin or are of the meningo-encephalitic and meningomyelitic type. The meningo-syphilitic cases that so often suggest the possibility of latent paresis have been cleared up by a few salvarsan injections. The spastic forms of spinal paralysis, the Erb type in particular, which is in all probability a form of a true degenerative disorder, gives unsatisfactory results.

In tabes dorsalis, Sachs does not claim any actual cure, but in reviewing his cases and seeing the patients months and years after treatment had been instituted, there is no doubt, he thinks, that the patients were satisfied with the results of treatment; that they are better in many ways, and that we can not afford to disregard this treatment in tabes without, however, claiming more for it than the results justify. There is no doubt that in many instances the vesical symptoms, the sexual impotence, the lightning pains, even the gastric crises, have disappeared under intensive intravenous treatment. On the other hand, he is firmly convinced that in a large number of cases, particularly in private practice, in which the intravenous treatment

has been given from the outset, the symptoms have progressed, and full-fledged tabes dorsalis has been developed in much the same way that it would have progressed if no active treatment had been given. The meningo-myelitic forms of a tabetic type are the ones that can be benefited most readily.

Finally, in general paresis, salvarsan treatment has not helped him to effect a cure, but it has in some instances retarded the rapid progress of the disease.

Intraspinous Injections of Neosalvarsanized Serum in Nervous and Mental Disease. The results obtained in 212 cases are bound, says Alfred Gordon,[10] to create a spirit of optimism in the treatment of patients with evidences of syphilis. In some cases the expectations are greater than in others, as for example in early cases. In some cases the amelioration of the nervous and mental manifestations is little short of brilliant, and indeed it is apt to render one highly enthusiastic. But a calmer consideration of the actual facts, especially when the cases are followed up for a sufficiently long time, does not permit him to be over-sanguine in spite of the favorable results obtained in the majority of his cases. There were sufficient recurrences to warrant a conclusion that the last word in the treatment of nervous and mental diseases of syphilitic origin is far from having been spoken. On the other hand, a mere comparison of the results obtained from the old methods of treatment with those from the newer procedures must convince an impartial observer that the latter are much superior to the former. A procedure that enables us to bring spirocheticidal reagents into direct contact with the cerebrospinal system, intraspinally and intracerebrally, seems to be the most logical one. The fact that satisfactory results are obtained in most serious affections is encouraging and promising. It points the way in which our efforts should be directed. The future success lies in the perfection of this method.

[References to the treatment of syphilis of the nervous system may be found in the Practical Medicine Series, Vol. X, 1914, p. 37; 1915, p. 65; 1916, p. 56.

(10) New York Med. Jour., May 12, 1917, p. 873.

The close adherence to any one or other particular method of treatment is not justified by the facts. Many patients are benefited by intravenous treatment alone, and where clinical amelioration and a normal serologic picture are obtained by this method of treatment, intraspinous medication, which is by no means entirely harmless, and certainly frequently attended with pain, is not called for. On the other hand, there are a number of cases in which such pleasing results are absent, and here it would seem that the patient should not be deprived of any further effort which may offer even the slightest amount of hope.—ED.]

Myelitis Following Salvarsan. Socin[1] reports a case of a woman 38 years old with a history of abortions and miscarriages, whose husband died of "softening of the brain." During the last six months she had been restless and agitated, with frequent headaches and some cutaneous disturbance over the shoulder and knee undoubtedly of syphilitic origin, although the Wassermann test was twice negative. An intravenous injection of 0.5 gm. of salvarsan was given and repeated five days later. The first dose was borne well, but following the second there was a marked rise in temperature, and in two days symptoms of encephalitis developed. These gradually subsided and then symptoms occurred which indicated a severe and extensive affection of the spinal cord with decucitus. There was no indication of an infection and the occurrence of the early encephalitis led Socin to assume that the drug was responsible for the whole syndrome. After six weeks some of the symptoms abated, but spastic paraplegia of both legs was left and persisted until death. Sensory disturbance led to a localization of a lesion in the lower cervical region, and the necropsy findings confirmed the diagnosis of a toxic myelitis.

Factors Which Govern the Penetration of Arsenic, Salvarsan and Aniline Dyes into the Brain, and Their Bearing on the Treatment of Cerebral Syphilis. Certain dyes, particularly methylene blue and neutral red, were found by James McIntosh and Paul Fildes[2] to

(1) Corr.-Bl. f. Schweiz. Aerzte, November, 1916, p. 1537.
(2) Brain, Vol. 39, Parts 3 and 4, 1916, p. 478.

stain the white matter when intravenously introduced. Other stains, as fluorescin, indigo carmine, acid fuchsin, light green, trypan red and blue, while staining the other tissues of the body do not stain the central nervous system.

They were led to the observation that there was a connection between the solubility of the dyes in chloroform and their penetration into the nerve cells by finding that all those dyes which stain the central nervous system are soluble in chloroform and those which do not are insoluble. They consider that the blood-vessels of the brain possess an impermeability peculiar to themselves. This view is at variance with conclusions which they had reached previously; namely, that salvarsan was not a neurotropic drug. Subsequently they concluded that this observation was wrong.

They found that salvarsan and neosalvarsan were insoluble in chloroform and, therefore, were inclined to believe that this fact can account for their absence from the brain. They feel that the present day arsenical remedies are to some extent inefficient in the treatment of syphilis of the central nervous system, because they do not possess the necessary solubility to allow them to pass from the blood-vessels into the brain substance. Their relative inefficiency has nothing to do with their absence from the cerebrospinal fluid.

[From a review of the literature it is apparent that the impermeability of the blood-vessels is due not to any structural or physiologic peculiarity, but to the fact that the tissue through which these vessels course, meninges and brain, have no chemical avidity for the substances circulating within them. This refusal to take up certain vital stains is not due alone to the fat insolubility of such stains. The permeability of blood-vessels determines only the capacity of a stain to come in contact with a cell, and the cell may refuse to take up the stain because of other factors—such as permeability of the cell membrane and reaction of cell contents to the stain. Some of the vital stains are insoluble in fats or lipoids. Many stains which penetrate living cell membranes do not stain the interior of the

cell, whereas some stains when allowed to enter through the cell membrane artificially stain the cell contents. Substances in possession of large molecular formulae penetrate blood-vessels and cell membranes with difficulty, but whether or no they enter into combination with cell contents is dependent upon other factors. The relation of these studies to the question of intravenous medication of salvarsan is very important, but the absence of staining of the brain by means of intravenous injections of trypan blue does not prove that the nervous tissue takes up salvarsan when introduced by other channels. A review of the literature can not but convince one that intraspinous medication does exert an influence not felt by intravenous medication alone, but the explanation of this can not rest in the fact that by this means the drug is brought into direct contact with the brain. Other factors, such as the production of a non-infective meningitis with its ensuing increase of permeability of blood-vessels, meninges and cell membranes certainly must play a large rôle in the mechanism.

Reference to vital staining in this connection may be found in the Practical Medicine Series, Vol. X, 1914, p. 30; and 1916, p. 70.—Ed.]

Syphilis of the Nervous System in Some of Its Clinical and Pathologic Manifestations. William G. Spiller[3] is of the opinion that in tabetic ocular palsies, as well as in those recognized as syphilitic ocular palsies, the lesion is not primarily nuclear, but is in the nerve fibers as they leave the brain.

He cites Stargardt, who investigated the causes of optic atrophy in tabes and paresis in twenty-five cases, and examined the visual system from the external geniculate body to the retina. When the optic nerve was normal the retina also was normal. Where changes occurred in the retina they were secondary to changes in the optic nerve and differed in no way from those observed after division of the optic nerve or compression of this nerve by a sclerotic internal carotid artery. The cause of the optic atrophy was exudative processes

(3) Amer. Jour. Med. Sci., October, 1917, p. 523.

in the chiasm and the intracranial portion of the optic nerves. The optic tract and external geniculate body showed only secondary degeneration. In cases of partial optic atrophy the atrophy was the result of partial infiltration of the intracranial portion of the optic nerve. Stargardt concludes that there was no ascending atrophy from any intoxication of the ganglion cells of the retina, as has been assumed. In all cases of optic atrophy he found infiltrative processes in the parts about the chiasm and the optic nerves. The changes in the optic nerves therefore resemble those in the nerve supplying ocular muscles.

Spiller says that it is desirable to remember that permanent results were accomplished in the treatment of nervous syphilis in some cases before the days of salvarsan and the modern laboratory methods of investigation. Unfortunately, we must confess that our modern methods, while usually of great value, are not satisfactory in all cases of nervous syphilis, and that some cases do not respond to any treatment, and others may respond and then relapse.

There are cases of syphilis with intense infiltration of mononuclear cells in the pia, such as is the common finding in nervous syphilis, and yet the clinical manifestations can not be distinguished from those of tabes.

Of much clinical and pathologic significance is the association of syphilis of the central nervous system with other lesions of this part entirely independent of the syphilitic process.

In a symposium held at a meeting of the Philadelphia County Medical Society, Sept. 27, 1916, Spiller referred to the probability of certain cases of epilepsy having an origin in congenital syphilis, and mentioned that the examination of the family of a patient may indicate that the patient probably has congenital syphilis.

Probably no one will dispute that syphilis may produce epilepsy, but there are some cases of epilepsy in which syphilis may only be suspected and not proved. Epilepsy is definitely caused at times by acquired syphilis, and it may be possible to trace the relation of cause and effect. In other instances of epilepsy the syphilis

remains unrecognized. The Wassermann reaction may be negative, as it frequently is, when syphilis of the nervous system is of very chronic type.

It is often stated that syphilis of the central nervous system is a diffuse process implicating both brain and spinal cord. This usually is a correct statement. Spiller calls attention to the occurrence of focal syphilis of the central nervous system, in which the symptoms indicate that the lesion is confined to a very limited area.

Usually when syphilis appears to be focal, careful examination will show further evidence of the disease.

The Duration of Paresis Following Treatment. According to William R. Dunton, Jr., and George F. Sargent[4] the duration of paresis following treatment by the Swift-Ellis method is about one-half that of cases treated by older methods. This conclusion is drawn from the study of eighty-eight cases of which ten were treated by the Swift-Ellis method. Their results are not particularly encouraging.

A Note Concerning Strains of Treponema Pallidum Obtained from the Brain of Paretics at Autopsy. Rabbits were inoculated with material from brains of seven cases of parenchymatous syphilis by J. A. F. Pfeiffer[5] in order to determine whether there is any possible ground for the assumption that a neurotropic strain of the *Treponema pallidum* exists. According to Noguchi a difference in the morphology of several strains of the *Treponema pallidum* is present. Of the seven cases examined, two strains survived several generations; neither showed any distinctive features in regard to the incubation time. Pfeiffer thinks that the thinner types of Noguchi play just as important a part in parenchymatous syphilis as the thicker ones, and that there is no reason to assume that a so-called neurotropic strain exists, since the different forms of treponema pallidum may all be isolated in syphilis of the nervous system.

(4) Amer. Jour. Insanity, October, 1916, p. 241.
(5) Proc. Soc. Exper. Biol. and Medicine, Vol. 14, 1916.

DISEASES OF THE BRAIN.

War Injuries to the Brain.

Shell Shock. An effort to enumerate and describe briefly the various conditions which are frequently met with and labeled as shell shock is made by E. F. Buzzard.[1] First of all, there are what may be called the pure exhaustion cases. The proper treatment of exhaustion cases is obviously rest in bed in quiet surroundings. The prognosis in cases of this class is very favorable under proper conditions of treatment; but the period of rest required varies with constitutional idiosyncrasies and with the degree of exhaustion presented when the patient is first seen.

Next to the pure exhaustion cases should be considered those patients who have inherited neuropathic or psychopathic tendencies and in whom the process of exhaustion has excited these dormant tendencies into activity. These form a large group, a fact which should occasion no surprise when it is remembered that the army is recruited in this war from the population as a whole without any attention being paid to the hereditary or constitutional fitness of the recruit to stand strain or fatigue. In this group we may place many patients who exhibit either for the first time or in the form of a relapse such phenomena as tics, articulatory defects, epilepsy, or phobias on the one hand or more serious forms of insanity on the other. Very few of the patients belonging to this category should be sent back to active service; many are best dealt with by return to civil life and some are suitable for the less strenuous military duties of home service.

Reference may next be made to a comparatively small class of what we may call "martial misfits." These are men who are compelled to join the army by public opinion, who may pass as normal individuals in ordinary life, who are quite aware that they can not stand the strain of warfare, and who are often quite frank

(1) Lancet, Dec. 30, 1916, p. 1095.

in confessing all these facts to the medical man who attends them on their return from the front.

We must recognize, in addition, the normal healthy individual who suffers from concussion as the immediate result of a too close intimacy with a shell explosion and who reacts in the same way as do most patients to a severe blow on the head. The period of unconsciousness is followed by a more prolonged period, during which the patient evinces symptoms similar to those of exhaustion. He is easily tired, irritable, overreactive to auditory and visual stimulation, lacking in confidence and concentration, and often depressed. He suffers from headache, insomnia, or fighting dreams, and in brief resembles the exhausted patients already referred to.

Much professional and public interest in shell shock has been centered on another group of cases which attract attention on account of their more theatrical attributes—the patients who suffer from so-called functional paralysis, anesthesia, mutism, aphonia, deafness, blindness, etc. If it were not for a certain amount of obloquy attaching to the word, Buzzard would not hesitate to class them all together under the name of hysteria.

With regard to the treatment of all these hysterical phenomena, the author's experience leads him to believe that any form of suggestion, whether applied under normal conditions or under the influence of anesthetics or hypnosis, may be successful but that success depends first of all on the willingness of the patient to recover, and secondly on the adequacy of the suggestive stimulation. There is, perhaps, one other precaution which should be taken by any medical man who has to treat these cases, and that is, while displaying a sympathetic understanding of the patient's story and complaints, not to express surprise or too obvious a spirit of scientific interest; more important still, he should refrain from discussing or demonstrating the patient's disabilities before others. In the case of a mute it is not good for the patient to hear that he can't talk; it is not fair to him to say that he won't talk; in the present

state of our knowledge it is best for everybody, and for science, to be content with the simple statement that he *doesn't* talk.

One is struck by the fact that only a certain proportion of persons suffering from head injuries develop fits. We are faced with the discovery that the locality of the injury has no apparent influence in the production, although, of course, it may modify the features of the epileptic attack. The severity of the injury has, so far as we can judge, no bearing on the question as to whether epilepsy is or is not likely to supervene. But we must not forget that there are numerous patients, all of whom have been subject to one or other of these grades of trauma, who go on living without developing any epileptic tendencies. The only conclusion which Buzzard has been able to draw from these facts is that we are all potentially epileptic, and that we only differ one from another in the ease or difficulty with which this latent process can be excited into activity.

It is imperative at this stage to remember that fits originate in damaged brain and not in bone or metal. We may feel that a depressed fracture is a condition which should be dealt with surgically and that it is impossible to be sure of its presence or absence without an exploratory operation. This may be a justifiable proceedings in any case where the site of the injury is clearly determined. We find that an operation soon after the infliction of the wound has been performed for the purpose either of exploration for foreign bodies or for sepsis and drainage, that the scar has healed and is healthy, and that there is no evidence of increased intracranial pressure. *X*-ray examination reveals the presence of no foreign body and of no fragments of bone either deep or superficial, and we conclude that a scar is formed in which perhaps the surface of the brain, the dura mater, and the scalp are all more or less involved. Buzzard holds that in such a case no operation is justifiable, that any attempt at surgical interference of any exploratory character can only lead eventually to further scar tissue and, more likely than not, to further injury of the brain.

Where the examination shows a similar healthy condition of the scar, but the presence of a superficial foreign body or superficial fragments of bone embedded in the damaged surface of the brain or in the tissue overlying it, we may take the view that such foreign bodies by their weight and mobility, in relation to the pulsation of the brain, may exercise some irritating influence upon that organ, and we may justify a desire to round up these alien enemies by the conviction that the operation can do no further damage to the brain.

The treatment of the epilepsy is, and can only be, medical and chiefly medicinal. It will depend upon the proper administration of bromides and other drugs and the proper guidance of the patient in the kind of life which he proposes to pursue. Buzzard has never seen a case of traumatic epilepsy cured by operation alone. So firm is his belief in prophylaxis and early treatment that he makes a rule of giving bromide in every case of head injury which comes into his ward, and if he had his way he would give some bromide in every case of the kind for at least six months after the date of injury.

Types of Neurologic Cases Seen at a Base Hospital. In remarking on the cases observed by him while in charge of the medical division of the English Base Hospital in France, given over to the care of the first "unit" sent out by Harvard University, John Jenks Thomas[2] says that in a surprisingly large number of these injuries, the nerve is found not to have been divided, but merely contused by the missile, or rarely compressed by hemorrhage within or about the nerve trunk, or by edema of the surrounding soft parts. This was usually shown by the retention of some degree of sensation in the skin area supplied by the nerve, although the motor function of the muscles supplied by the same nerve was generally totally lost.

Injuries of the spinal cord may be divided roughly into two general classes. First, and the most frequent, are those where the cord has been injured directly by the missile, or by fragments of the spine driven into it, which lacerate or compress it; and secondly, the cases

(2) Jour. Nerv. and Ment. Dis., December, 1916, p. 495.

in which we find softening of the cord or hemorrhages into its substance produced indirectly by the concussive effects of the projectile which merely touches the vertebral column, or by concussion without even this having happened. In these cases the bullet may pass through the body of the vertebra, or merely touch the spinous, articular or transverse processes. In the early stage after an injury of the spinal cord has been received, the plantar reflex has proved to be a fairly reliable guide as to the severity of the injury. In the severer cases, during the first two weeks, efforts to elicit the plantar reflex usually bring no response. In men who are less severely injured a flexor response may be obtained. Most favorable of all are the cases in which there is present an extensor response to the sensory stimulation, the typical Babinski sign, often accompanied by dorsiflexion of the whole foot or flexion of the thigh.

Injuries of the brain were quite frequent. One may speak of the surprisingly small size of the wound of entrance which may very easily be overlooked entirely, as there is always very trifling hemorrhage from it. This makes the danger that one may consider a transverse wound of the brain a penetrating one only, a very real one. Second, perhaps, comes the frequency with which one finds that what looks like a simple wound of the scalp is really a tangental wound of the skull, with a furrow channelled out in the bone, and a tear of the dura with more or less injury of the cortex beneath.

Experience with the wounds of the brains shows that early operation offers no advantages to compensate for the disadvantages of limited appliances at the hospitals near the firing line. Later, all of these wounds of the head should be explored. Experience has shown the desirability of not enlarging the opening in the dura made by the missile. Drainage is practically always required.

A point which deserves careful study by neurologists and surgeons is the treatment of the traumatic swelling of the brain which immediately follows the receipt of the injury. It may be that immediate treatment with

the control of this edema in view should be carried out at the first field hospitals, or as early as possible after the receipt of injury. It has been found that very frequently this can be controlled quite readily, and a hernia of the brain prevented, by repeated lumbar punctures, a procedure that can easily be done at places where there is no time or appliances available for operative interference, such as opening of the skull. Occasionally, a decomposition operation on the opposite side of the head to that of the injury may be required.

Functional nervous troubles are fairly common among the soldiers at a base hospital. Curiously enough these functional cases seem to develop very rarely in those who have been wounded. Hysterical paraplegia is not uncommon in such cases, or hysterical hemiplegia. Hysterical amblyopia is observed rather commonly also, and hysterical aphasia.

Very frequent, too, are cases which have been called by a variety of names, the favorite one being neurasthenia, or shock, which seems very certainly to be a general functional nervous disturbance. The most frequent symptoms observed were a rapid and easily accelerated pulse, a rather rapid, coarse tremor, which frequently affected the trunk and head as well as the extremities, and marked susceptibility to fatigue. These patients showed no evidence of a cardiac lesion of any sort, either by the presence of fibrillation or extra systoles, nor any distinct arrythmia or enlargement. In short, the entire physical examination was persistently negative except for the rapid pulse, which was rarely above 140. Sweating was present in rather a marked degree upon excitement or exercise. Quite often, too, there was found a marked vasomotor skin reaction, with the white line, bounded by two reddened ones, but without much edema. The author adds that in these cases neither the physical nor mental stigmata of hysteria were ever found.

War Aphasias. As regards disturbances of speech due to bullet or shell wounds of the brain, P. Marie and C. Foix[8] reach the following conclusions:

(8) Rev. Neurol., February-March, 1917.

1. The more strict localization of the cerebral lesions caused by the projectiles, allow observation—and that rather often—of isolated syndromes, which are but rarely seen in the diffuse lesions produced by arteritis in hemorrhage or cerebral softening.

2. This study shows first of all that there are two distinct zones in the brain, one, anterior, in relation with anarthria; the other, posterior, in relation with aphasia. Between the two we find a mixed zone, deep involvement of which determines global aphasia.

3. The anarthric syndromes are remarkable by their tempestuous and severe onset, and their favorable course. After a period of absolute impossibility of speech, recovery ensues, sometimes complete, at others with a dysarthric sequel, ordinarily of little importance.

4. The zone in which the anarthric symptoms are observed corresponds superficially to the lower one-third of the ascending frontal convolution and impinges slightly on the extreme posterior aspect of the second and of the third frontal convolutions. Deeper in it covers the insula and the lenticular nucleus. It is impossible to say whether in such cases the superficial or the deep lesions play the more important part. The further back the lesion is in this zone, the more marked are the anarthric symptoms. The third frontal convolution, as one of the authors has shown, does not play an essential part in the function of language.

5. Among these anarthric syndromes several special types must be distinguished: (*a*) Recovery complete or sensibly so, corresponding to the most anterior lesions; (*b*) marked dysarthric sequel, often with some very slight aphasic symptoms, corresponding to the most posterior lesions; (*c*) slow and scanning speech with slow ideation corresponding to the highest lesions, and similar to those which are observed with deep lesions of the anterior frontal region.

6. The aphasic syndromes have a more serious prognosis than the anarthric ones. After the stage of impossibility of speech, there generally succeeds a long period of important aphasic disturbances with generally a marked diminution of intelligence.

7. The zone in which the aphasic syndromes are observed may be approximately mapped out in the following manner: Above, the interparietal fissure; in front, above the Sylvian fissure, by the Rolandic convolutions—below, by the posterior one-third of the temporal lobe; behind, by the cuneus; below, by the inferior border of the brain. The marginal lesions give rise to attenuated syndromes, except in front, where the association of anarthric and aphasic symptoms constitute, if the lesion is deeply situated, a global aphasia.

8. In this zone the lesions are not equivalent, and for this group of syndromes from lesions of the outer surface of the brain, the four following types must be distinguished: (*a*) A syndrome of the temporal; (*b*) a syndrome of the region of the gyrus supramarginalis; (*c*) a syndrome of the region of the curved convolution (*i. e.*, gyrus angularis); (*d*) slight aphasic syndromes from marginal lesions or superficial ones of the zone of speech.

9. The *syndrome of the temporal region* is the purest; the anarthria is practically *nil*. The aphasia affects especially the denomination of objects (loss of vocabulary). Comprehension of speech, reading, writing, computation, are equally much involved. Intelligence is much diminished, hemiplegia absent, hemianopsia ordinarily in quadrant-form rather common.

10. The *syndrome of the region of the supramarginal gyrus* comprises a global aphasia in which anarthria and aphasia are associated. All the elements of speech are affected very nearly proportionately. Brachial monoplegia is the rule, ordinarily slight. Hemianesthesia is observed nearly always, it may be limited to the upper extremity. In a few cases there is bilateral apraxia predominating on the right. There is no hemianopsia.

11. The *syndrome of the region of the curved convolution* is observed in lesions of the curved convolution and the extreme posterior part of the first two temporal convolutions. It is characterized by the great predominance of alexia, which is almost absolute. Writing is relatively almost intact. Comprehension of speech and computation are most affected, as well as the names

of objects. Anarthria is practically absent. No hemiplegia and no hemianesthesia. Hemianopsia is constant, either complete or quadrant-shaped.

12. The *slight aphasic syndromes from a marginal or superficial lesion* of the speech region are very frequent as well as of very great importance from the practical standpoint.

13. The deep lesions of the region intermediate to the zone of anarthria and that of aphasia, properly so-called, give rise to deep global aphasias and but slightly curable.

14. All these notions appear to the authors to be of great importance for understanding the difficult and so controverted question of aphasia. Thus they find a study of the war wounds confirms, generally speaking, the opinions promulgated by one of them on the subject of the clinical manifestations and the anatomo-physiology of this great syndrome.

The Cerebrum.

The Relative Amounts of Gray and White Matter in Some Normal and Pathologic Brains. An attempt has been made by John Cruickshank[4] to measure by direct dissection the relative amounts of gray and white matter in a small series of normal brains and to compare the results with the findings in brains from cases of mental disease which at post-mortem examination exhibited varying degrees of atrophy.

The conclusions which he draws from these results are that the atrophy of the brain which is so common a feature at autopsy in chronic cases of insanity is due more to the loss of the underlying white than to the loss of the superficial gray matter, notwithstanding the well-known morbid histologic changes in the latter. This relatively greater loss of the white matter of the brain in chronic insanity is quite in keeping with our present knowledge of the neuron when we remember such facts as the association of the myelinization of

(4) Jour. Ment. Sci., January, 1917, p. 93.

nerve fibers with the acquisition of higher neural and mental function in the process of development, and the essential nutritive rôle of the body and nucleus of the nerve cell.

The Water Content of Some Normal and Pathologic Brains. It seemed to John Cruickshank[5] to be of interest to determine what chemical changes accompanied the shrinkage in the size of the brain resulting from general or local atrophy. From the examination of various portions of brain tissue for the amount of water it was found that the more marked the degree of atrophy of the brain, the greater was the amount of water in the brain tissue. The amount of water was always increased in brains which showed marked atheroma of the basal or other arteries. The gray matter contain 10 per cent. more water than the white, not only in cases of normal brains but also in pathologic and atrophic brains. In the case of the pathologic brains the amount of water was in the majority of cases greater than in the corresponding portions of the normal brains. The pathologic series showed greater water in both gray and white matter in all of the portions.

Sensory Disturbances of Cerebral Origin. Consideration of Types and of Diagnostic Elements. A review of the forms of impaired sensibility in various cerebral lesions by Alfred Gordon[6] demonstrates the fact that the superficial sensations are to a greater or lesser extent involved in all the lesions of the brain considered here. The capsular lesions give the most pronounced and the most persistent disturbances in the touch, pain and temperature senses. The least involvement is seen in the cortical cases. The three senses run parallel in degree and extent. A distinct dissociation is seen in the peduncular lesions and this dissociation is analogous to the syringomyelic type. In the thalamic cases there is also a dissociation, but of a special kind, namely, a diminution of touch sense, pleasant feeling from warmth and disagreeable feeling from cold. Disturbances in the

(5) Jour. Ment. Sci., January, 1917, p. 98.
(6) Archiv. Med., December, 1916, p. 733.

deep sensibilities were found in all varieties of lesions considered here. The most constant and most extensive variety was the cortical one. Next in order of degree of involvement is the thalamic kind. Among all forms of deep sensibilities position and muscular sense were most frequently affected. These were disturbed in all except in the peduncular variety. The localization sense was found altered next in frequency. Astereognosis comes next in order of frequency.

In spite of this apparent regularity in sensory impairment, certain exceptions were nevertheless present in Gordon's cases. Special emphasis is laid on a case in which an involvement of the parietal lobe and a destruction of the posterior portion of the internal capsule gave no sensory disturbance of any sort. In capsular lesions in which the superficial sensibility is so conspicuously involved there was also impairment of some deep sensibilities. In the peduncular variety the deep sensibilities were more involved than the superficial ones. Astereognosis, which has been looked on as a symptom of a lesion in the parietal lobe, was present here, not only in the cortical, but also in the thalamic and peduncular, variety.

On the other hand, the lesion of the parietal lobe gave no disturbance of the stereognostic sense. Similarly, in the case reported by Gordon in 1908, a bullet entered the left parietal region and subsequently an operation with extensive destruction in the same area did not cause a loss of the stereognostic sense or of any other form of sensations. Among other authors, Verger and Abadie, for example, published in 1900 the history of a case in which a sarcoma of the dura compressed the entire parietal lobe so that the cortex was markedly flattened and still the general sensibility and the stereognostic sense remained intact. In connection with these clinical irregularities, which are usually called exceptions, it may not be superfluous, says Gordon, again to call attention to the case in which a cortical hemorrhage strictly confined to the parietal lobe, but close to the ascending parietal convolution, gave place not only to an impairment of the superficial sensibilities,

which was to be expected, but also to a motor hemiplegia, although the hemorrhagic area was far removed from the anterior central convolution.

Multiple Spontaneous Intracerebral Hemorrhages. Out of 128 cases of intracerebral hemorrhage observed by Phyllis Greenacre,[7] in twenty-four (about 18 per cent.) the brain showed discrete multiple hemorrhages, none of them being traumatic.

Plurality of hemorrhages, the feature leading to this report, was represented in three brains by three distinct sites of hemorrhage, and in the remaining twenty-one by two. The combination of one hemorrhage into the internal capsule or basal ganglia and one into the pons was most frequent, occurring in fifteen brains (63 per cent.). Of the seven brains (32 per cent.) in which both hemorrhages were into the cerebral hemispheres, five presented bilateral symmetrical hemorrhages implicating both internal capsules or basal ganglia. One brain contained hemorrhages into the cerebrum and the cerebellum, and one hemorrhages into the cerebellum and pons. In one brain only did the pontine hemorrhage appear to be primary, a single large clot in the center of the pons being associated with multiple punctate hemorrhages in the left internal capsule.

The appearance of the pontine lesions varied greatly. In eight brains they were numerous and small, scattered irregularly throughout the pontine substance. In seven brains, moderately large hemorrhages occupied the center of the pons, filling the fourth ventricle and surrounding tissue.

In the examination of an adequate number of brains containing multiple spontaneous hemorrhages, pontine hemorrhage was found secondary to extensive hemorrhage into the internal capsule and basal ganglia in a majority of cases. The liability of the pontine arteries to secondary rupture is due probably to their anatomic pecularities (in that they are short, small, terminal branches given off nearly at right angles from a large trunk), and possibly to a disturbance of blood-pres-

(7) Bull. Johns Hopkins Hosp., February, 1917.

sure in the circle of Willis with a back-flow into the posterior branches.

Indications for and Results of Cerebral and Cerebellar Decompression in Acute and Chronic Brain Disease. Elsberg[8] states that the first effect of a local increase of pressure is that the brain is pushed in another direction. The increased pressure on the inner surface of the skull may be followed by absorption of bone in one or another location.

The stretching of the dura probably causes the headache, and possibly the nausea and vomiting; the forcing of fluid into the sheaths of the optic nerves is followed by papilledema and choking of the discs, while the pressure on the brain itself is followed by slowing of the pulse and respiration and interference with function.

Motor-tract symptoms are apt to be made worse in a left or right mid-brain tumor by a subtemporal decompression on the right side. The symptoms of a tumor which lies medianward to the internal capsule may be exaggerated by a subtemporal decompression. In cases of these two classes it is advisable to do a bilateral decompression, the right side being done first and the ventricle punctured, so as to avoid too great a prolapse of the left temporal lobe and a resulting aphasia.

It is rarely possible to revive a patient who is in deep coma from a brain tumor by any kind of an operation unless the coma is due to the distention of the ventricles. Therefore, if the neurologist sees a patient with a brain tumor in coma he should recommend a rapid aspiration of the ventricle or a puncture of the corpus callosum, perhaps with a subtemporal decompression. If there is not a decided increase of fluid in the ventricles, the chances for return to consciousness are slight.

Patients with the signs of fracture of the base, and of increasing intracranial pressure, should have a subtemporal decompression performed.

Punctiform Hemorrhages of the Brain in Gas Poisoning. The subject of punctiform hemorrhages in the brain in gas poisoning has awakened new interest on

(8) Surg., Gynec. and Obst., August, 1916. See also Practical Medicine Series, Vol. II, 1917, pp. 244-247.

account of its existence in fatal cases of shell shock with burial, and in cases of death from inhalation of poisonous gases, either as a result of their liberation by explosives in confined spaces, such as mines, trenches, and dug-outs, or as a result of an offensive gas attack by the enemy. F. W. Mott[9] endeavors in this communication to explain the cause of these punctiform hemorrhages.

He summarizes his paper as follows:

The reason why these punctiform hemorrhages occur in the white matter of the brain in gas poisoning is primarily due to the anatomic condition of the vessels in the white matter of the cerebrum, where the arteries are terminal; each small artery having a separate capillary system, likewise the emerging veins. A tendency to stasis may be brought about in these separate vascular systems by the failure of the heart as a force pump and suction pump, also by those respiratory conditions which lead to right heart dilatation, and interference with the return of blood from the skull. In most cases the two factors are combined. It seems probable, however, that either factor may act independently in causing inflammatory stasis and thrombosis, resulting in multiple punctiform hemorrhages. In the gas case, in which the hemoglobin has been converted into pigment granules, it seems probable that the hemorrhage may be accounted for by embolic occlusion of the capillaries and arteries.

[Previous reference to Mott's work may be found in the Practical Medicine Series, 1916, Vol. X, p. 173. —Ed.]

Relative Perceptions of Movement and a Stationary Object in Certain Visual Disturbances Due to Occipital Injuries. In the examination of real cases of injury to the occipital lobes George Ruddoch[10] has been struck by the frequency with which movements could be detected in the affected field and a stationary object could not be seen. Accordingly, he proceeded to chart both and to find if any conclusion could be drawn from the

(9) The British Med. Jour., May 19, 1917, p. 637.
(10) Proc. Royal Soc. Med., Vol. 10, No. 3, January, 1917.

records. He attempts to demonstrate from cases of visual defects of the occipital region, (1) that the genuineness of "a something moving" should be recognized as one of the visual preceptions, (2) that it may be dissociated from the perception of a stationary object, (3) that when recovery of vision occurs the perception of "movement" precedes that of the object, and (4) that recovery of "movement" visions begins at the periphery. He mentions a few of the visual defects which he thinks resemble disturbances of sensation:

1. The dissociation of primary visual perceptions of light, movement, stationary objects, form and color.
2. Inability to localize an object seen and to estimate its length.
3. Inability to appreciate "differences"—relative lengths and distances.
4. Inability to distinguish between a flat disc and a sphere.
5. Irregularity of response to stimuli.
6. Apparent untrustworthiness of the patient has been described by Head and Holmes as being a typical feature of cortical disturbance of sensation.

Disturbances of the Localization and Discrimination of Sensations in Cases of Cerebral Lesions, and the Possibility of Recovery of These Functions After a Process of Training. T. Graham Brown and R. M. Stewart[1] in an exhaustive study of a subject were enabled accurately to localize tactile stimuli which were applied (among other places) to the palm of the right hand and to the palmar aspects of the right fingers. The defect of localization was, in fact, gross. It was not, however, possible to attempt a localization. In fact, when a spot in this region was touched the subject usually made localization evident, although that localization was often a wrong one.

The disturbance of localization of tactile stimuli in this case was probably a mixed one as regards the definite elements in the localization. In the first place, there was a definite defect in the element of character and individuality in the localization of tactile stimuli;

(1) Brain, October, 1916, p. 348.

and in the second place, there was a defect, amounting in some cases to positive error, in the element of position. Such being the condition of the subject they set themselves to train selected spots on the palmar aspect of one of the fingers. The result of this training was two-fold. In the first place, there was a very marked improvement of the localization of tactile stimuli on the trained spots, both as compared with the accuracy of that localization on the same finger before the training and with the accuracy of localization upon the other fingers after the training. In the second place, there was a much smaller general improvement of the accuracy of localization on the other fingers as compared with their individual accuracies in the records which were taken before the training of the right index finger was commenced. The authors do not claim, however, that no change in the condition of the central lesion occurred, or that no general improvement in the localization of tactile stimuli occurred throughout the whole course.

Chronic Nephritis Simulating the Symptoms of Cerebral Neoplasm. We accustom ourselves as pointed out by Joseph Collins[2] unconsciously to feel that choked disc means increased intracranial pressure incident to brain tumor, abscess, sinus thrombosis and fracture of the skull, and so it does in the majority of instances; but it should never be forgotten that it occurs in a score of other diseases; myelitis and disseminated sclerosis; infectious diseases, such as whooping cough and erysipelas; hemic disease, such as chlorosis, leukemia and scurvy; in disease the result of disordered internal secretion, and in states of intoxication such as from lead and quinine.

He reports a case which presented the classical symptoms of brain tumor, or at least those of increased intracranial pressure, and they developed in what may be called the typical way. Taking into conjunction the fact that they had their beginning somewhat more than two years after the patient received an injury to the skull, a thing not unusual in the his-

(2) Jour. Amer. Med. Ass'n., May 5, 1917, p. 1314.

tory of brain tumor and considered important both as an exciting and a determining factor, it was almost imperative to give that diagnosis full consideration. Naturally, it is quite within the grounds of possibility to have a neoplasm developing in a person who has chronic nephritis. In this case it is not necessary to assume such duality of disease, as the vasculo-renal disease is quite adequate to account for all the symptoms, including the papilledema.

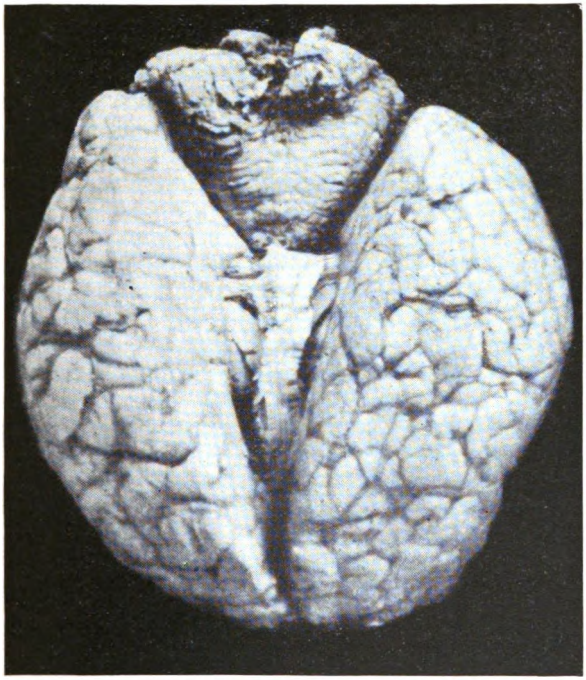
Histologic Studies on the Localization of Cerebral Function. The Brain of the Gorilla. Alfred W. Campbell[3] examined the right cerebral hemisphere of the baby gorilla and this paper is to be regarded as an appendix to the writer's well-known monograph on localization of cerebral function. He recognized in this brain all the areas previously found in the cerebral cortex of man, the chimpanzee and the orang-outang, and, in addition, describes two new areas not previously recognized, the "subtemporal" and "extra-olfactory." The subtemporal area is confined to the lower surface of the lobe and covers the whole of the third and a considerable portion of the fourth temporal gyrus. It has the same inferior boundaries as the original area, except that it is separated from the olfactory area by a zone of cortex, now revealed also for the first time, in the anthropoid brain, and termed the "extra-rhinic" or "extra-olfactory" area. It is suggested that this latter probably represents an olfactero-psychic area and thus brings our conception of the olfactory area, as possessing a sensory and a psychic portion, into line with other sensory realms.

Brain Tumors.

A Study of the Anatomic Location and Histopathology of Ninety-Nine Brain Tumors. In a study of ninety-nine brain tumors Frederick B. Clarke[4] classified them as to histopathology as follows: Gliomata and ependomata, thirty-eight; endotheliomata, hemangio-

(3) Abstracted from reports from the Pathologic Laboratory of Lunacy Dept., New South Wales Government, 1916, Vol. III., pp. 19-35; from Rev. Neurol. and Psychiat., January, 1917, p. 8.
(4) Rev. Neurol. and Psychiat., November, 1916.

PLATE III.



Crowding of the cerebellum upward between the lobes of the cerebellum by a tumor of the posterior cranial fossa. Separation of occipital lobes 9 em.—Clarke, page 98.

peritheliomata and peritheliomata, thirty-seven; metastatic carcinomata, seven; gumma, six; tuberculomata, five; sarcomata, four; glia-sarcomata, one; blood cyst, one.

Tumors of the forebrain were fairly equally distributed in the two principal subdivisions of this part of the brain. Those arising from structures above the tentorium number sixty-six, and those subtentorial in origin number thirty-three. Forty-five occurred on the right side, thirty-seven on the left side and seventeen were near the center of the brain. Fifty-eight developed in males and thirty-seven in females; in four cases the sex was not given. Gliomata were much more frequent above the tentorium than below. Cyst formation was marked in only four cases, although small cystic areas were frequently seen with the microscope. Endotheliomata arising from the dura in the posterior cranial fossa were in this series well formed and those of the anterior and middle fossa were in a few instances diffuse and highly malignant, involving the bone and cranium in a few cases.

Metastatic carcinoma occurred twice, and there were two cases of tumor of the third ventricle. The three ependomata of the fourth ventricle made their way to the surface of the brain and spread over the neighboring structures.

It would seem to Clarke that tumors of the posterior fossa arising within the brain substance have a tendency to involve the fourth ventricle, since it was true in nine of twelve specimens.

In this series of nineteen extracerebellar growths the left side was involved eleven times and in intracerebellar tumors involving a lateral lobe, of which there were two cases, both occurred on the left side.

Clarke calls attention to the enlargement of the hemisphere containing the tumor in his cases. This is most marked in gliomata, and the increase is out of proportion to the increase in bulk produced by the addition of the tumor. This is due, as pointed out by Spiller, to a reactive gliosis. This gliosis should be more marked

to tumor than to infectious granulomata. However, this is not necessarily true. Some degree of dilatation was present in the ventricles in thirteen cases of supra-tentorial growths. Tumors of the basal ganglion may cause obstruction to the flow of cerebrospinal fluid in the third ventricle, leading to enlargement of the lateral ventricle on the side opposite the tumor, and dilatation of the anterior and posterior horns on the side of the tumor.

There were thirty-three sub-tentorial tumors, eighteen extracerebellar and fifteen within the brain; eleven of the eighteen extracerebellar tumors when examined for hydrocephalus showed that seven produced some dilatation of the ventricles. In tumors developing within the cerebellum, of seven examined six showed hydrocephalus in some degree. Clarke is of the opinion that the hydrocephalus is due to the interference with the flow of cerebrospinal fluid by occlusion from pressure on the foramina or aqueduct, by which it flows from one ventricle to the other or from the fourth ventricle into the subarachnoid space, and not because of the increased intracranial pressure producing a functional inactivity of the arachnoid tufts.

Thirteen extracerebellar tumors were studied for displacement of the cerebrum. In five, marked displacement upward occurred. In connection with cerebellar displacement, the brain stem is often found to show marked kinking. The displacement of the cerebellum upward caused separation and atrophy of the occipital lobes with relative frequency, occurring in five cases. Stretching of the tentorium must be considered as a cause of headache. Hemorrhage of sufficient size to increase already existing symptoms occurred within and remained confined to the tumor in eight specimens. Hemorrhage of sufficient amount to be the principle cause of death occurred eight times, in three instances at a distance from the tumor. In five instances hemorrhage evidently arising in the tumor found its way to a considerable distance. Hemorrhage remaining confined to the tumor is more common in gliomata (Plate III).

Metastasis of Cancer in the Central Nervous System. An Experimental and Clinical Study. Metastasis of carcinoma or sarcoma in the brain is a comparatively rare anatomic finding. Krasting made an exhaustive statistical study on the subject, based on an analysis of 12,730 autopsies performed in the Basel Hospital between the years 1870 to 1905. Among these autopsies, 1,078 cases of carcinoma were found. The brain was examined in 817 cases, in thirty-nine of which metastasis of carcinoma was found. There were 160 cases of sarcoma, and of 118 cases in which the brain was examined, metastasis was found in fourteen. Thus metastases of carcinoma were found in 4.7 per cent. of the cases examined, and in 11.6 per cent. of sarcoma. R. Williams, as a result of an analysis of 893 autopsies of carcinoma of the breast, found metastasis in the brain in only 6.6 per cent. of the cases. These figures present a very small percentage when we consider that more than half of all cases of cancer show metastasis in various organs.

The result of the experimental studies reported by Isaac Levin[6] indicates that the brain of a fowl has the power to depress the development of an inoculated particle of sarcoma tissue into a tumor; in other words it impedes the growth of the artificial metastasis, which every inoculation of a tumor into a lower animal practically represents. It is reasonable to suppose that the comparative infrequency of the formation of metastases in the human brain may also be due to the fact that the latter organ inhibits the formation of metastases, though the tumor emboli may have reached it.

The characteristic feature of the three cases of metastasis of carcinoma of the brain which are described consisted in the extensive metastatic dissemination of the carcinoma in various organs and in the extremely severe course which the disease took. The symptoms of the metastasis in the brain appeared comparatively late in the course of the disease. The impression may be gained from the analysis of these cases that the brain resists the invasion of the carcinoma longer than the other organs. Lung involvement apparently took place in two

(6) Jour. of Nerv. and Ment. Dis., June, 1917, p. 481.

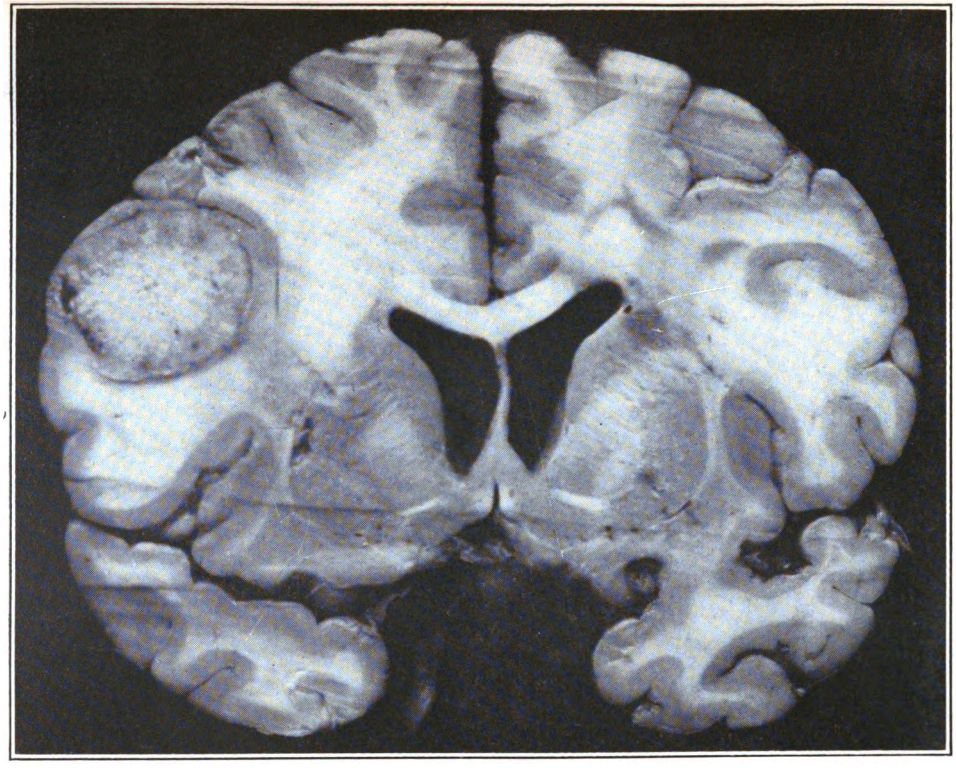
of the reported cases. The frequency of the involvement of the lungs observed in cases of metastases of carcinoma of the brain is taken by some authors to indicate the importance of mechanical conditions for the formation of these metastases. It is presumably easy for carcinoma emboli from the lungs to reach the brain. The weak point of this hypothesis consists in the fact that metastases in the lungs are found in over 25 per cent. of cases of carcinoma, while metastases in the brain, as before stated, are found in only 4.77 per cent. of cases. In other words, only a small number of the cases of carcinoma which develop metastases in the lungs also metastasize in the brain (Plate IV).

Metastases in the cord are even less frequent than metastases in the brain. The writer found only seven cases of metastases in the cord reported in literature, and of these only one case, that of Taniguchi, was described in detail.

Comparatively more frequent are metastases in the meninges and in the spine. The latter condition is of interest both from the theoretical and the clinical standpoint. The theoretical importance of the condition consists in the fact that while the metastatic tumor destroys the vertebrae, grows into the spinal canal and causes clinical symptoms of compression of the cord it does not invade and form a metastasis in the latter organ. Apparently here is another instance of the resistance of nerve tissue to the growth of carcinoma. Clinically, these conditions must be classed not with skeletal metastases, but with metastases in the central nervous system, since they very early give rise to symptoms characteristic of tumors in the central nervous system.

Levin calls attention to two factors concerning the difficulty of diagnosis of these metastases. First, carcinoma and sarcoma grow invasively and destroy brain tissue during their growth and consequently the combined amount of tissue inside of the skull does not change, and therefore no symptoms manifest themselves until a vital portion of the brain in destroyed.

The second and by far the more important handicap to the correct diagnosis of a metastasis in the central



Gross photograph of a frontal section of the hemispheres passing through of the anterior commissure showing a metastasis in the right hemisphere—Levin, page 101.

nervous system is presented by the fact that the primary tumors may be so insignificant in comparison with the condition in the central nervous system that they escape recognition. In other cases, the primary condition, though easy of recognition, may simply have been lost sight of by the clinician.

Roentgenography in the Localization of Brain Tumor, Based Upon a Series of One Hundred Consecutive Cases. Based upon the first 100 patients with brain tumor who have come to the surgical service of Dr. Halstead since September, 1912, George J. Heuer and Walter E. Dandy[7] present a valuable contribution to our knowledge of neurology and roentgenography. The statement as to the number of cases, however, is not literally accurate, for they have included in the series patients with aneurysm, pachymeningitis interna hemorrhagica, gumma, tubercle and arachnoiditis, who presented the clinical picture of tumor, and whose roentgenograms showed abnormalities upon which they wished to comment. Ninety-six patients were operated on and through operation or subsequent autopsy the authors know the character and location of the lesion in sixty-eight.

Regarded from the viewpoint of *x*-ray diagnosis, cerebral tumors may be roughly divided into three groups: (1) Those which themselves cast a shadow in the *x*-ray plate; (2) those which, although casting no shadow, caused some deformation of the skull which they could recognize; and (3) those which gave no evidence of their presence in the roentgenogram. The first group includes but few tumors, and in their experience only those that are bony or have undergone calcification, or, the uncalcified growths that have invaded the accessory sinuses. The majority of tumors belong to the second group. These changes may be direct or local, caused by a tumor directly implicating a bony structure; or indirect, due to the pressure of the brain upon the interior of the skull caused by a tumor at a distance.

When, however, an uncalcified tumor invades the sphenoidal sinus, it may become visible in the roentgen-

(7) Bull. Johns Hopkins Hosp., November, 1916.

ogram; for the invading tumor-tissue is sufficiently denser than the air normally contained in this sinus to cast a shadow.

True bony tumors (osteoma, osteosarcoma), or tumors which have undergone calcification or ossification, cast shadows in the *x*-ray plate that can be readily recognized; nevertheless, in a search of the literature they have found less than twenty recorded instances.

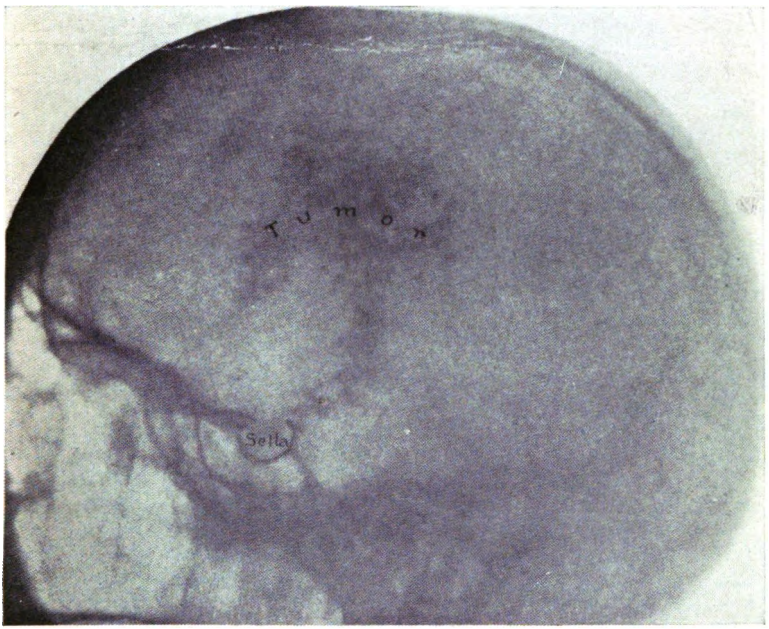
The shadow cast by a calcified or bony growth varies with the nature of the tumor and the degree of bony or calcified change. It represents an area of increased density and is therefore of a lighter color than the surrounding negative. As commonly seen, the shadow of a solid tumor which has undergone extensive bony or calcified degeneration is quite dense, but rarely of uniform density, owing to the scattered distribution of the bony or calcified areas. Its outlines may be definite, or indefinite and marked by islands of calcified tissue (Plate V).

Quite a different appearance may be presented by those shadows due to areas of calcification in the walls of cysts, abscesses and aneurysms. In place of a solid shadow they may appear in the roentgenogram as a series of incomplete ring-shadows that mark the boundaries of a more or less spherical mass. Most typically this type of shadow is seen in the wall of an aneurysm that has undergone calcification (Plate VI).

The discussion of roentgenographic shadows due to the calcification of brain tumors should not be dismissed without mention of shadows the result of calcification of structures normally present in the intracranial space; for, unless the character and usual position of such shadows are known, they might well be confused with tumor-shadows. In the roentgenograms of patients presenting clinical evidences of tumor the authors have observed shadows due to the calcification of the chorioid plexus, pineal gland and falx cerebri.

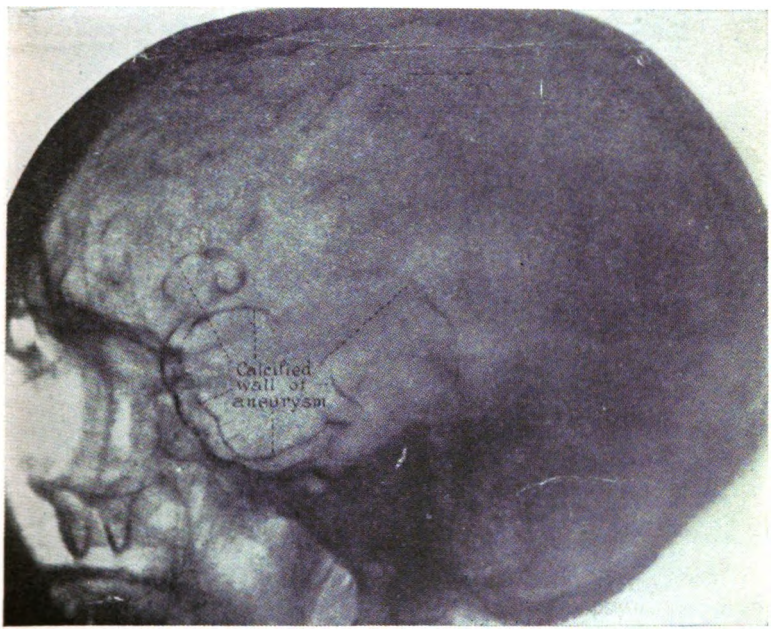
Chorioid Plexus. In the single case which they have had, the shadow was lobate, lying about 3 cm. above and slightly posterior to the petrous portion of the temporal bone. Seen in the single plate, the shadows of the

PLATE V.



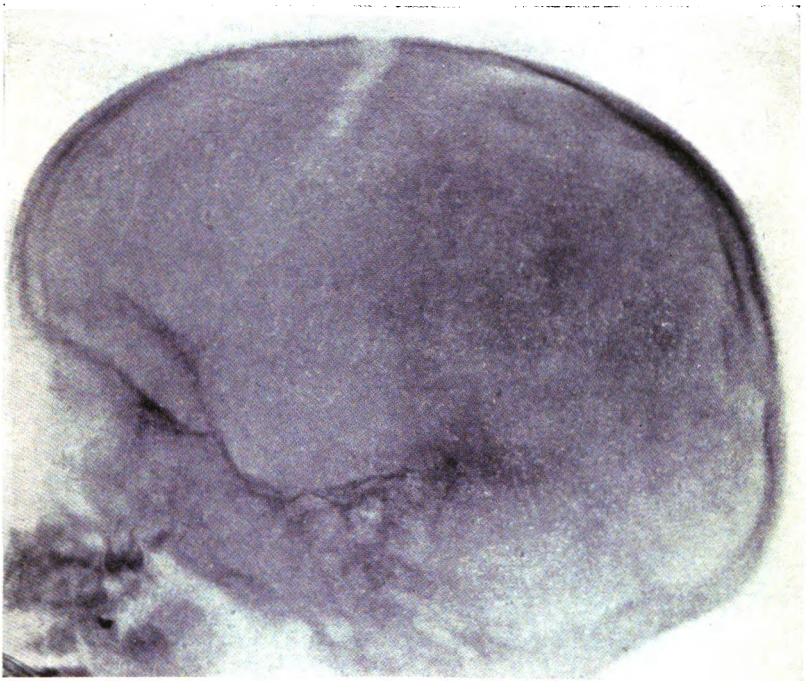
Roentgenogram showing the shadow of a calcified tumor. The tumor is probably a suprasellar growth which has extended upward into the hemisphere—Huer and Dandy, page 103.

PLATE VI.



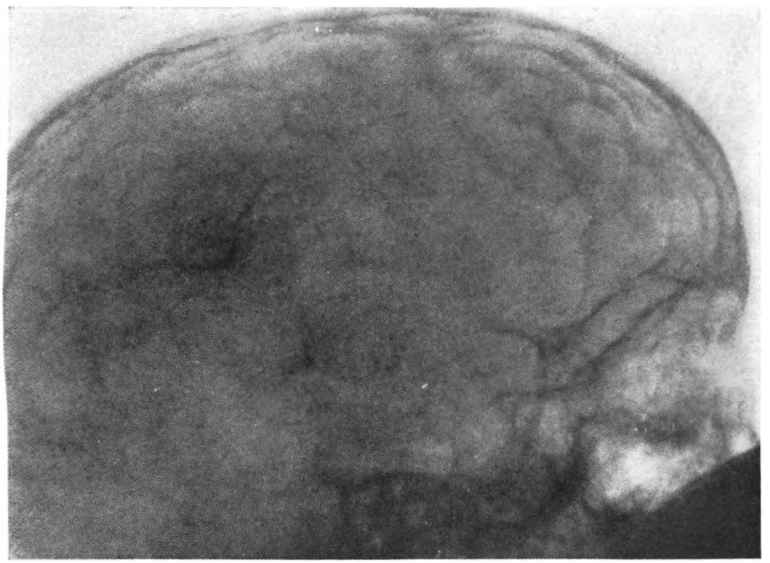
Roentgenogram showing the shadow cast by an aneurysm of the internal carotid artery. The areas of calcification in the wall of the sac appear as dark, heavy lines. The sella turcica appears to be completely destroyed. The local convolutional atrophy of the inner table is seen in the frontal region—page 103.

PLATE VII.



Roentgenogram of a patient with cerebellar tumor showing enlargement of the head, wide separation of the sutures, and complete destruction of the sella turcica. There is no convolutional atrophy. The internal auditory meatus is enlarged—page 103.

PLATE VIII.



Roentgenogram of a child with "idiopathic" internal hydrocephalus, showing a general convolutional atrophy of the inner table of the skull—page 103.

two chorioid plexuses are superimposed. With stereoscopic vision, two symmetrically placed shadows occupy corresponding positions in the two hemispheres. In an antero-posterior roentgenogram the shadows are projected to the upper inner angle of either orbit.

Pineal Gland. The pineal gland seems especially prone to calcification. In the roentgenograms of seventeen patients its shadow is round or oval, varying from small size to 4 or 5 cm. in diameter, and situated in the midline from 1.5 to 2.5 cm. directly above the temporal bone. The authors have identified this shadow with the pineal gland by autopsy studies.

Falx Cerebri. A shadow due to an area of calcification in the falx cerebri is present in the roentgenogram of one patient. A single plate (lateral view) shows a definite shadow, crossed apparently on either side by the greatly dilated meningeal arteries, suggesting a calcified tumor in the percentral region. The stereoscope, however, and more certainly an antero-posterior roentgenogram, show it to be exactly in the midline; and although not certified, it is in all probability due to an area of calcification in the falx cerebri.

Pseudo-Shadows. This term is applied to various light and dark areas in roentgenograms of the skull, which may be confused with true tumor shadows. In their study the authors have often seen so-called pseudo-shadows. They occur most frequently in the temporal fossa and in the occipital, suboccipital and frontal regions.

Attempting to correlate the clinical and roentgenographic manifestations of brain tumor, the authors have grouped these changes into those due to general pressure—the result of a tumor anywhere within the intracranial space; and those due to local pressure—the result of a tumor within or in immediate proximity to the part affected.

Enlargement of the Skull. The condition is associated in every instance with separation of the cranial sutures and, in most, with thinning and general convolutional atrophy of the skull.

Separation of the Cranial Sutures. Owing to the great

variation in the prominence of the suture lines in apparently normal skulls, it was difficult to differentiate between the slight grades of diastasis and normal variations. Attempting to be fair in their interpretation, they state that separation of the sutures occurred in the roentgenograms of fifty-seven patients. It is evident that well-marked separation of the sutures is an infrequent finding in roentgenograms of patients with cerebral tumor, but a common finding in patients with cerebellar or posterior fossa tumors (Plate VII).

General Convolutional Atrophy. The term is used in the sense of Spiller to describe a form of pressure atrophy of the inner table of the skull most characteristically seen in the roentgenograms of patients with "idiopathic" internal hydrocephalus. Marked general convolutional atrophy is more commonly seen in subtentorial or in suprasellar tumors which have caused an internal hydrocephalus.

The roentgenograms of twenty-one patients, none of whom had hypophyseal or suprasellar tumors, show destruction of the sella turcica or atrophy of its posterior clinoid processes. From the position of the lesions, the sellar destruction must be considered a general pressure phenomenon, in the patients with cerebellar tumor, possibly due to the distention of the third ventricle. In the patients with cerebellar, or with cerebral tumors lying at some distance from the sella turcica, atrophy of the posterior clinoid processes must be regarded as due to general pressure (Plate VIII).

The local changes in the skull which they have observed are: (1) Local hypertrophic changes in the skull; (2) local enlargement without destruction; (3) local atrophic changes in the skull; (4) local convolutional atrophy, and (5) local destruction of the sella turcica.

The herniation of the cerebellum into the foramen magnum and, occasionally, of the cortex into the foramina of exit of the cranial nerves, suggests that these structures may undergo enlargement recognizable in the roentgenogram. So far, however, the authors have been unable certainly to recognize such changes; and

their remarks are confined to the internal meatus. The internal auditory meatus is definitely enlarged in the roentgenograms of eleven patients.

Local Atrophic Changes in the Skull. The local atrophy of the vault over an immediately underlying growth—a great diagnostic aid in the localization of brain tumor—has in their experience been a rare occurrence.

Local Convolutional Atrophy of the Skull. This form of local atrophy of the vault the authors interpret as due to the local pressure of a subcortical tumor; the extent of the convolutional impression on the inner table being roughly proportional to the depth of the tumor below the surface.

Local Sellar Destruction. This is characteristically seen in the roentgenograms of six patients with hypophyseal and two with suprasellar tumor.

Vascular abnormalities in the skull, the result of brain tumor, manifest themselves in the roentgenograms by an enlargement of the diploetic sinuses or an excessive grooving of the bone, either of vessels normally present or of newly formed and abnormally distributed vessels. Obviously, increased intracranial pressure, regardless of the location of the lesion, may cause vascular stasis and a general enlargement of the cranial vessels demonstrable in the roentgenogram; a superficial tumor, a local increase in the number and size of the blood-vessels of the adjacent dura and bone.

General dilatation is seen more commonly in patients with cerebral or presumed cerebral lesions; more rarely in those with posterior fossa tumors. In the roentgenograms of four patients there is, as demonstrated with a stereoscope, a marked—in one, an enormous—unilateral dilatation of the cranial vessels, a circumscribed network of vessels which drain into a single large vascular trunk. In all four patients, the lesion at operation proved to be a dural endothelioma lying within the area outlined by the vascular network. In one, without other localizing signs, the unilateral vascular dilatation enabled them to make a positive focal diagnosis.

A stellate arrangement of the diploetic sinuses in the

parietal region of the skull has been observed in the roentgenograms of eight patients. It occurs apparently regardless of the location of the lesion, and in the author's experience is merely a sign of venous stasis.

Tumors of the Gasserian Ganglion. A case of this rare condition is reported by Ernest Sachs.[8] In a careful survey of the literature he has found twenty-one cases of extradural tumors of the Gasserian ganglion. Of those in which the site of the lesion was mentioned all but three occurred on the left side. This fact, which seems more than a coincidence, suggested that there might be some embryologic basis. There have been eight operated cases; and only in two of them patients were relieved. One died nine months after operation, but four months after her symptoms redeveloped; the other died of abdominal metastases two years after the brain operation.

The case reported is that of a patient who began to have pains along the distribution of the ophthalmic division of the left fifth nerve. This pain gradually spread and two months later involved all three branches and was continuous. Ten months later, when examined, the patient, a woman, showed a paresis of the left sixth nerve and marked weakness of the motor branch of the left fifth nerve. No evidence of increase of intracranial pressure was found. She was operated on and an extradural tumor removed. The posterior root was evulsed from the pons and the operation concluded. Following the operation, complete paralysis of the third and sixth cranial nerves was present and motor aphasia with slight weakness of the right hand. The motor aphasia disappeared on the fourth day, the third nerve paralysis on the ninth and a month following operation no double vision was present. After removal of the drains, a left twelfth-nerve paralysis occurred and a herpetic blister of the nasopharyngeal side of the soft palate on the left side. In about six or seven weeks the patient returned, complaining again of severe pains. About two months afterward she was again operated upon with no relief, and died fourteen months after the onset of the

(8) Ann. Surg., August, 1917, p. 152.

condition. The tumor, upon examination, was found to be an endothelioma.

Sachs states that a severe, continuous pain in the distribution of the trigeminus, with paresis of the motor branch of the fifth nerve, justifies at once the diagnosis of tumor of the Gasserian ganglion.

Vascular Lesions.

Intracranial Aneurysms. The clinical and pathologic findings in forty-four new cases of cerebral aneurysm are described by E. G. Fearnsides[1] as follows:

1. From the point of view both of the clinical history and the post-mortem appearance the cases showing at necropsy aneurysmal forms on the basal cerebral arteries fall naturally into two groups: the non-inflammatory and the inflammatory.

2. In a series of 5,432 consecutive examinations of the head cerebral aneurysms due to the non-inflammatory changes in the middle wall of the artery occurred in 0.57 per cent., and aneurysms due to inflammatory changes in the cerebral arteries associated with infective embolism in 0.25 per cent.

3. In the non-inflammatory group degenerative changes in the cells of the basal cerebral arteries were often found associated with high blood-pressure, cardiac hypertrophy and evidence of general arterial disease, but in many of the cases there was no evidence of excessive blood-pressure either at autopsy or from clinical observations, and the general arterial degeneration and the degeneration of the cerebral arteries was no greater than in the average subject of the same age.

4. In the non-inflammatory group, a congenital weakness of the arterial walls at junctional points is an important factor in their formation.

5. The proportion of aneurysms associated with infective embolism in the cerebral arteries to those in all the other arteries in the body was as 15 to 9.

6. In this series of cases no example of a cerebral aneurysm due to or associated with an infection by the

(1) Brain, October, 1916, p. 224.

Spirochaeta pallida occurred, but 92.6 per cent. of the aneurysms of the aorta, 100 per cent. of the aneurysms of the other elastic arteries, and only 6.25 per cent. of the aneurysms of the muscular and small elastic arteries, to which class the arteries of the circle of Willis and the cerebral arteries generally belong, were secondary to the local weakening of the arterial wall due to the inflammatory reaction set up by the activity of the *Spirochaeta pallida.*

7. Rupture of the cerebral aneurysm led to death in 0.44 per cent. of all cases of examination of the body, while direct rupture of the extracranial artery during the same period was the cause of death in 0.91 per cent.

8. The largest aneurysm measured 30 mm. in diameter, but the great majority were much smaller.

9. In fifteen out of thirty-one cases (48.4 per cent.) of non-inflammatory cerebral aneurysms, whose ages varied from 53 to 19 years, and averaged 38 years, no cardiovascular hypertrophy was present.

10. The age incidence of cerebral aneurysms of embolic origin is determined by that of infective endocarditis and other chronic septicemic and pyemic conditions, and is lower than in the non-inflammatory group.

11. In twenty-five out of thirty-one cases (80.7 per cent.) of non-embolic aneurysm clinical manifestations attributable to cerebral hemorrhage occurred in five out of thirty-one (16.1 per cent.). No clinical manifestations of intracranial disease were recorded at autopsy and unsuspected and unruptured aneurysm was found often; in one case an unruptured aneurysm at the junction of the right carotid and middle cerebral arteries was found at the necropsy on a patient who for some time had suffered from frontal headache and had been deaf in the right ear.

12. Among the cases which at autopsy showed ruptured non-embolic aneurysms two patients died before admission to the hospital and ten were admitted after a first epileptic seizure and died without ever recovering consciousness.

13. Simple leakages of blood due to partial ruptures of the aneurysm sac occurred in thirteen out of thirty-

one cases (41.9 per cent.). In these patients a history of multiple seizures of an apoplectic type occurred. The clinical manifestations in this type of case form a definite nosologic group rendering their diagnosis not difficult.

14. The first rupture of the sac of a cerebral aneurysm was often brought about by a violent muscular effort or acute emotion.

15. Before the aneurysm sac ruptured, signs of intracranial pressure were rare, but after this had taken place it was frequent; ten cases out of thirty-one before death showed changes in the optic fundi.

16. The headaches associated with non-embolic cerebral aneurysms have some localizing value.

17. The interference with intellect and reflex motor function which occur in association with cerebral aneurysms, both before and after rupture, depend upon the site of the vascular deficiency and the course which the hemorrhage takes after rupture has occurred.

18. The cranial nerves are frequently involved in blood-clot after rupture. Optic atrophy, bitemporal hemianopsia and lesions of the optic tract have been described and the third pair of cranial nerves were those most commonly involved in this series of cases. Supraorbital neuralgia may be caused by pressure upon the Gasserian ganglion. In cases of aneurysms of the posterior fossa, and more especially of the cerebellar arteries, an involvement of the facial nerve after its exit from the pons was common. A subjective complaint of noises in the head occurred only in one case, and in this series no local affection in the posterior fossa of the ninth, tenth, eleventh or twelfth pair of nerves was noted.

19. After rupture of aneurysms of the posterior fossa a complaint of stiffness of the neck is a sign valuable in diagnosis.

20. The finding of blood cells and blood pigment in the cerebrospinal fluid is the only clinical proof of cerebral hemorrhage; in ruptured aneurysms staining of the cerebrospinal fluid occurs early.

21. Of thirteen cases aneurysm on the cerebral arteries due to infective embolism, ten were associated

with ulcerative progressive endocarditis; in five cases a positive blood-culture was obtained, and in two cases the onset of nervous manifestations first caused the patient to seek admission to the hospital.

22. Rupture of the sac of an embolic cerebral aneurysm led to cerebral hemorrhage before the death of the patient occurred in nine of thirteen cases.

23. The localizing signs in cases of embolic aneurysms are usually scanty.

[Reference to aneurysms of blood-vessels of the brain may be found in the Practical Medicine Series, Vol. 10, 1914, p. 56. In this review are cited the collections of a large number of cases.—Ed.]

Four Cases of Hemiplegia Caused by Embolism Following Gunshot Wounds of the Carotid Arteries. In these four cases reported by L. Colledge and J. Shaw Dunn,[2] the early appearance and completeness of the hemiplegia and the rapidly fatal issue resemble the effects of ligature of the common carotid artery. In all four, there was thrombosis in the carotid arteries in the neck, consequent on damage of the arterial wall, and in each there were several inches of the internal carotid artery patent between the thrombus and the portion blocking the cerebral vessel. The occlusion of the cerebral vessel consequently occurred by embolism, and similar emboli were found in one instance in the branches of the external carotid also. The damage to the large cervical arteries was in every care considerable. In three there was actual perforation of the wall; in the fourth the trunk was found completely severed, but this probably occurred secondarily by sloughing after the vessel was fully thrombosed.

Studies of Eye Ground Changes in Cerebral Spastic Paralysis. From original observations in eighty surgical cases J. A. Kearney[3] says that certain definite changes are so often observable in the eye-grounds of children who exhibit spastic conditions traceable to intracranial hemorrhage at birth that the picture is characteristic. Lumbar puncture in these cases demon-

(2) Lancet, Jan. 13, 1917, p. 57.
(3) New York Med. Jour., Feb. 3, 1917, p. 214.

strate that the pressure of the cerebrospinal fluid is above normal, and usually a history is given of difficult or instrumental delivery at birth.

The usual appearance of the eye-grounds of children who exhibit spastic signs, when these are due to intracranial hemorrhage at birth.

The entire fundus is generally slightly hazy and presents the appearance of particles of finely ground black pepper shaken lightly upon it; the color without the disc is changed from the normal orange red to red; the temporal portion of the disc is paler than normal and its margins are plainly visible; there is an increased redness in the nasal portion and a slight blurring of its margins; the upper and lower margins near where the retinal vessels pierce the disc are blurred also; the veins are distended slightly out of proportion to the calibre of the arteries, and the light streaks in all of the vessels are either missing or barely visible.

While the foregoing is an unusual picture, there are some eyes which exhibit milder signs, while others are even more marked. A few there are that show postneuritic signs, such as pallor of the entire disc, indistinct margins, light streaks of exudate along the vessel walls with leveling of the physiologic pit; some that show an unequal distribution of subretinal pigment, and others an entire loss of pigment.

In the fundi of infants' eyes when an intracranial hemorrhage occurs at birth, we may expect to find the appearance of recent general edema or of a papilledema. This picture differs markedly from that seen in advanced spastics.

The Basal Ganglia.

A Comparative Study of Cases Showing Thalamic Lesions at Autopsy. The records of the last 1,000 autopsies, extending from number 2,600 to 3,600 in the files of the Government Hopsital for the Insane were gone over by Arrah B. Evarts[4] and all those cases showing any gross lesion of any character in any por-

(4) Jour. Nerv. and Ment. Dis., May, 1917, p. 385.

tion of the thalamus were selected, and there were added to these the few showing lesions only in the caudate or lenticular nuclei, even though the thalamus escaped. In this way thirty-one cases were selected.

Evarts decided to tabulate all cases showing any lesion of the thalamus, regardless of what else might be present.

The *"Syndrome Thalamique"* was first described by Roussy in 1907, although in searching the literature on this subject in 1912 Head found that similar cases had been reported before. The signs and symptoms upon which Roussy laid stress were hemi-anesthesia, involving the deep sensibility more than the superficial; paroxysmal pains on the affected side; little or no hemiplegia; hemi-ataxia and athetoid or even choreic movements on the affected side.

In comparing the ages at onset, he found that the senile and arteriosclerotic period contains the most cases, there being twenty such who were 60 years or beyond. One, at 59, just misses being included; while two others, at 56 and 57, are not far away. Hence, the later years of life, when the arteries have become more or less hardened, is the period when such a lesion can be more confidently expected.

In comparing the mental diagnoses we may consider as being identical for all practical purposes, dementia associated with arteriosclerosis; psychosis associated with arteriosclerosis; post-hemiplegic dementia; and dementia associated with organic brain disease, the organic brain disease in this particular case evidently being arteriosclerosis. He thus found a total of twenty-two cases, or 78.5 per cent., in which arteriosclerosis was undoubtedly the cause of the trouble. He found but three cases in which the presence of syphilis was definitely known, all three of these cases being diagnosed general paresis.

Syphilis and alcoholism are several times repeated, and over and over again do we read "Civil War Veteran." This at first was considered merely a curious coincidence, but as the table lengthened and this fact continued to occur until fourteen cases, ten of which

belonged in the first two groups in which lesions of the thalamus were seen, were found to have this history in common, it was decided that it must have some bearing on the problem. We know the period of terrible emotional strain through which these men passed, when brother was fighting against brother and the nation was rent to its foundations. Therefore, it does not seem at all unlikely that this awful emotion should have left the thalamus a vulnerable point at which a definite lesion might be expected when arteriosclerosis appeared in the due course of time.

In comparing the autopsy findings, the cases fell naturally into three groups; first, those cases in which there were lesions of the thalamus and one or the other, and sometimes both, of the other two nuclei; second, those in which the lesion existed in the thalamus only; and third, those in which the lesion existed only in the lenticular and caudate nuclei, one or both. There were thirteen in the first group, eight in the second and seven in the third.

It is startingly clear that those lesions in the thalamus alone were much less frequently accompanied by paralysis than those in which there was involvement of the lenticulate or caudate nuclei, one or both. The reflexes in these cases can only be described as variable.

Disorders of sensation were noticed in only nine of the entire twenty-eight cases. These disorders of sensation are what Bing calls *direct thalamic symptoms,* being dependent upon the function of the thalamus, which he calls "the great connecting station . . . through which practically the whole of the sensory tracts must pass before diverging to the cortex."

Hemichorea and hemi-athetosis were found but rarely. Thus Evarts had but four cases showing anything like the characteristic movements of the thalamic cases, and they were not sufficiently close to the accepted symptoms to warrant any conclusions. Besides these, some involvement of movement was present in seventeen cases, usually incoördination or tre-

mor, or both, but it is highly possible that the shrinkage of the brains could account for this. Some disturbance of speech was present in thirteen of these cases, grading from mere incoherence and slurring to the hemiplegic speech. There were five patients who suffered from convulsions. One of these was a paretic and two were epileptics, and two suffered from arteriosclerosis.

The thalamic over-response in the emotional field was found in five cases. Besides, there were six cases from the entire twenty-eight which were considered emotionally indifferent. In looking over the mental manifestations exclusive of hyperkinesis and the emotions, he found nothing especially characteristic.

Now in comparing these cases as units with each other, Evarts found not one to present the perfect picture of hemiparesis, hemiathetosis, loss of superficial sensation and deep muscular pains, together with the mental phenomena of hyperkinesis and emotional over-response.

He concludes:

1. Lesions of the thalamus are more likely to occur in the later years of life.

2. An early, severe and long-continued emotional strain leaves the thalamus susceptible to future trouble.

3. Lesions of the thalamus seldom exist alone.

4. The presence of a partially recovered hemiplegia is not especially diagnostic of thalamic involvement.

5. Sensory and motor disturbances over half the body point more certainly toward a lesion of the opposite thalamus.

6. While the thalamic syndrome is characteristic if present, its absence does not indicate that the thalamus is intact.

7. Hyperkinesis is not so constant as expected, and often it can be accounted for by the arteriosclerosis present, as well as by the implication of the thalamus.

8. However, no other mental phenomena are so constant as hyperkinesis and the emotional over-response.

The Anatomic Findings in a Case of Progressive Lenticular Degeneration. In describing the pathology of Wilson's disease J. A. F. Pfeiffer[5] says that considerable degeneration was perceptible in the lenticulate nuclei, but the cortex and white matter of the hemispheres were not visibly altered. No disease of the internal capsules, caudate nuclei or optic thalami could be discovered. The left lenticulate nucleus appeared more severely affected than the right, and the outer portion of the putamen was replaced by a narrow cavity. The outline of the cavity was sharply defined against the external capsule, which was seemingly attenuated. The claustrum, periclaustral lamina and cortex of the insula presented a normal aspect. The right lenticula was shrunken and irregular, and small areas of softening were scattered through the nucleus. A cystic like cavity was found involving the outer and posterior part of the putamen. The capsula extrema and cortex of the island of Reil were normal. The cerebral vessels were not thickened, irregular in lumen or atheromatous. The ventricles were not dilated.

The microscopic alterations in the cortex were characterized by changes involving the neurones and glial tissue. The ganglion cells in the frontal region were more severely affected than in other parts of the cortex. A swelling of the cells was observed, but shrinkage and other types of cellular disease were likewise frequently encountered, limited mostly to the small and medium sized pyramids. In the motor region, the giant cells were not perceptibly affected, but the commissural and associated neurones were altered.

The neuroglia tissue was not increased to any extent in the cortex, and its intensity seemed to correspond to the degree of cellular alteration in different regions. The alterations in the glia were characterized in some instances by enlargement of the nucleus and a greater intensity in the staining reaction of the cytoplasm; and in others by a shrinkage, angularity or elongation of the nucleus, with increase of the chro-

(5) Jour. Nerv. and Ment. Dis., April, 1917, p. 289.

mation granules. No abnormal formation of fibers was observed.

Advanced stages of nerve cell degeneration were encountered within the putamen, and in those areas contingent to foci of softening. Practically all the cells contained much fatty substance; and in many instances had almost completely vanished. The neuroglia tissue exhibited progressive and regressive changes. The gliogenetic reaction presented a remarkable picture in some sections, and mitotic changes were observed in many foci. Macrophagic gliogenous cells were encountered, and within the area of softening large aggregations of fatty granular cells were discernible. Various products of disintegration were in evidence, and the adventitial spaces of the capillaries distended. In general, however, no abnormalities of the vessels were perceptible.

The degenerative changes were found to be most pronounced in the lateral and posterior part of the nucleus. The internal and external laminae were markedly diseased, and the internuncial fibers degenerated. The internal capsule appeared normal in all sections. In the subthalamic region the corpus Luysii was atrophic, and a deficiency in the fibers of the ansa lenticularis discernible. A considerable number of cells in the nucleus rubber were altered.

The result of the miscroscopic examination would indicate that in this disease the pathologic process, although extensively involving certain definite areas, may to a greater or less degree affect other regions.

The basal ganglia were most severely diseased, especially that portion of the lenticulate nucleus known as the putamen, in which area an extensive destruction and softening of the tissue occurred.

The remaining part of the lenticulate nucleus, and the caudate nucleus were less severely affected; and the alterations in the cortex were not intense.

The pathologic changes were characterized by a degeneration of the neuronic elements, with a compensatory proliferation and hyperplasia of the glial tissue. Many singular morphologic gliogenous variations were

exhibited. No evidence of inflammation or pathologic vascular alterations were discovered.

It seems scarcely feasible, therefore, to accept the inference that the hepatic disease plays a primary rôle and generates the toxin.

[Although Pfeiffer maintains that the vascular changes in his case were negligible, in a case observed by one of us (L. J. P.) the vascular changes in a section stained by a silver impregnation method were the most striking features of the pathology. The vessels were tortuous, gnarled, twisted and shredded. A marked perivascular gliosis was present and a hyalin and fibrous degeneration existed. The vascular changes were not unlike those described by Cerletti as occurring in cases of atrophy and in this particular case reflected favorably on the theory of an abiatrophy as a cause of lenticular degeneration.—Ed.]

The Pineal Body.

Hyperplasia of the Pineal Body. Two cases of lesions in the pineal body are described by Howard H. Bell,[6] the changes have been in part similar to those occurring with involution and have caused tumor-like enlargement of the pineal body.

Few lesions of the pineal body have been observed. Symptoms attributable to abnormalities of the pineal body have been observed only with an increase in its size and in most instances have been due to regional pressure, though in a few instances associated metabolic manifestations have been attributed to this organ.

The pineal body develops rapidly and reaches its greatest growth at the fifth or sixth year. Beginning at about the seventh year, and ending at about the fourteenth year there occur certain well-recognized changes spoken of as involution of the pineal body. By involution is designated the changes occurring between the seventh and fourteenth years which are characterized by proliferation of connective tissue, the formation of neuroglial plaques which may at times

(6) Jour. Nerv. and Ment. Dis., December, 1916, p. 481.

contain cysts, and the appearance of concretions. The capsule thickens and the septa become widened and relatively conspicuous, particularly where several septa come together.

The pineal body of Case I under discussion measures 16 mm. long, 8 mm. wide and 5 mm. vertically—being thereby equal to more than three times the size in cubic millimeters of the average normal pineal body. In Case II it measures 15 mm. long, and 9 mm. in its other dimensions, thereby being equivalent in cubic millimeters to more than six times the average normal pineal body.

In Case I, the enlargement of the pineal body is brought about by increase in all the pineal elements that make up the pineal body, namely neuroglia, connective tissue and pineal cells. The presence of cysts increases the size of the body. The pineal cells are in intimate relation to neuroglia fibers and various transitions occur between this type of cell and the smaller neuroglia cells. In Case II, the cysts are microscopic in size and infrequent. The pineal is larger than in Case I and there is greater hyperplasis of the elements which compose it. Pineal cells are especially abundant and have the characters of those found in Case I (Plate IX).

Bell says that in association with the process of involution there may be tumor-like enlargement of the pineal body characterized by proliferation of the pineal cells. In association with hyperplasis of these cells there is no functional disturbance in other organs of the body.

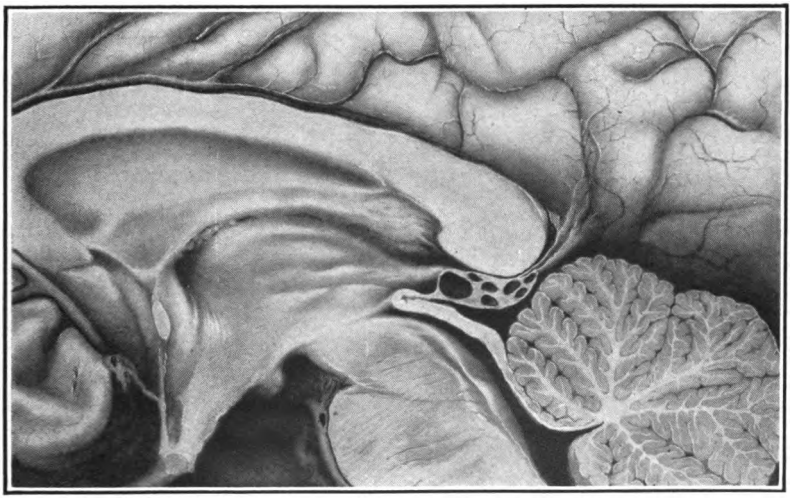
[A study of the pineal gland may be found in the Practical Medicine Series, 1913, Vol. X, p. 101.—Ed.]

The Hypophysis.

A Pure Traumatic Lesion of the Hypophysis: Adipose-Genital Syndrome and Diabetes Insipidus. This case is reported by Maranon and Pintos.[7] A boy, aged 13, was shot at about 10 feet distance with a revolver

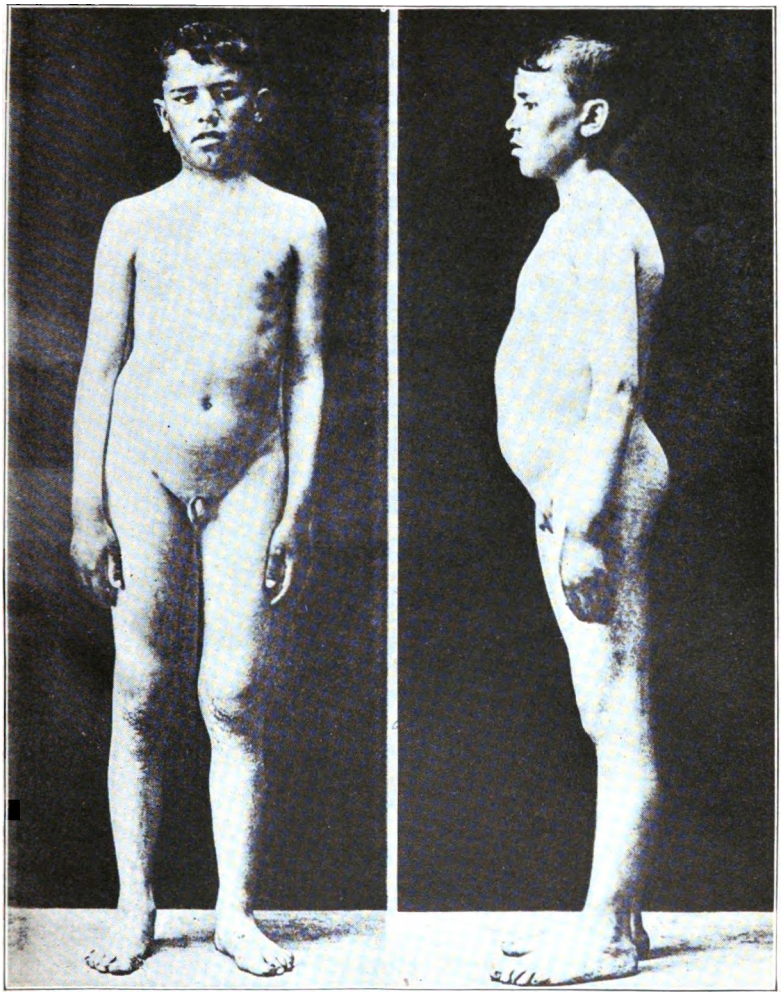
(7) Nouv. Iconog. de la Salpetrière, 1916-7, No. 4.

PLATE IX.



Case I. Showing the enlarged pineal body with cysts—Bell, page 119.

PLATE X.



Adipose-genital syndrome and diabetes insipidus, showing physical changes —Maranon and Pintos, page 120.

of 1/5 in. caliber, the missile penetrating the midfrontal line in an almost sagittal direction. The boy did not feel the least pain, did not lose consciousness, but continued to play; there was scarcely any hemorrhage. In a few hours there was slight pain in the right eye which disappeared spontaneously. About a month later, the parents noticed that the boy passed much urine and had great thirst. A few months still later, the abdomen enlarged. There were neither nervous nor psychic troubles.

Examination (seventeen months after accident): Height, 136 meters; the weight was not excessive (36 kilos), but it could readily be seen (Plate X) that *the adipose infiltration* gave an aspect much different from boys of his age. The subcutaneous tissue in the epigastric region was markedly infiltrated with fat. The sexual organs showed an evident arrest of development. One can not be certain that there is atrophic regression, but the father claims that previously the testes were well developed, but at this time they were no larger than those of a child of 7 or 8 years. Cryptorchism existed, it was only by some effort that they could be made to descend into scrotum, which was rudimentary. The penis was very small. *There was no trace whatever of the secondary sexual characteristics,* which at that age and that climate [Spain] should have been commencing to appear.

The culminating symptom was the polyuria. The boy urinated frequently, nearly every 45 minutes, day and night; when asleep he often passed urine in bed. He had an enormous thirst, drinking frequently and two or three glasses at a time.

Not the slightest alteration could be found as regards the sympathetic system. Tendon and skin reflexes were normal, as was also sensibility. He had no trouble on walking. The pupillary reflex was normal. Pupils were equal. There was no bitemporal hemianopsia. Fundus oculi were normal. From the psychic standpoint there was some retardation which may be estimated at three or four years; the father does not consider this pathologic but the result of secluded life in

the country. Slight tachycardia (90), and hypotension were found. Lastly, since the accident there have appeared a few patches of melanoderma, diffuse and but slightly marked, mostly on the face and neck.

The *x*-ray showed the missile to be lodged in the region of the sella turcica, almost in midline, without involving the hypophyseal region,

For three months the boy was given hypophyseal medication by the buccal route (30 drops of the glycerinated extract of the hypophysis a day); at the end of this time the amount of urine was increasing—from 8 to 9 liters in 24 hours.

Injection of 1 c.c. of hypophyseal extract caused the quantity to fall to a liter in less than 24 hours. The specific gravity increased as well as the amount of chlorides, though not reaching normal. Polyuria reappeared in from 24 to 48 hours after each injection.

Surgical treatment was decided on, to which the father agreed. By frontal craniectomy the sella turcica was reached; this seemed normal. Through the optic chiasma, the bullet could be palpated in the floor of the third ventricle, so firmly fixed, that taking into consideration the bad pulse, the operation was abandoned. Death occurred within 24 hours, the polyuria persisting after the operation.

Necropsy: At the wound of entrance, 2/5 in. to left of midline, was a bone splinter 3/5 in. long, projecting between the hemispheres which were adherent at this point. There was no trace whatever of the track through the nerve centers which were absolutely intact, until the floor of the third ventricle was reached, there the foreign body was discovered, in the direction shown in radiogram, and located in the sheath of the hypophysis, as if it had attempted to enter the interior. A strong fibrous capsule surrounded the bullet, matting the tissue of the sheath as far as the posterior lobe of the hypophysis, on extracting the bullet this adhered to it. On the other hand, *the hypophysis was neither directly wounded nor compressed, its communication with the third ventricle was merely interrupted.*

This case confirms with the value of an experimental

demonstration the influence of the hypophysis on the adiposo-genital syndrome of Launois *et al.* The arrest of sexual development and increase of adipose tissue could be seen going on under the observer's eyes. The latter seemed later than the sexual arrest, corroborating the opinion of the authors that in this syndrome the fattening is due to the genital retardation more than to the hypophyseal disturbance itself.

The characters of this obesity are the same as that of the hypogenital type, confirming the hypothesis that many of the cases of obesity in children before puberty, with incomplete sexual development are in reality due to hypophyseal insufficiency, either simply functional or from some post-infectious alteration.

The authors call attention to a number of facts showing the relation between diabetes and hypophyseal function, which they believe should lead to its being classed among the affections of the endocrine organs, rather than with nutritive or nervous disorders as at present. These facts are (1) diuretic action of hypophyseal extract; (2) frequency of polyuria in acromegaly; (3) frequence of polyuria in the adiposo-genital syndrome; (4) coincidence of diabetes insipidus with other clinical symptoms presumably due to lesions of the hypophysis (dwarfism, eunuchism, infantilism, hemianopsia); (5) discovery of hypophyseal lesions in cases of diabetes insipidus (tuberculoma, gumma, glioma, etc.); (6) production of polyuria from an experimental lesion of the hypophyseal region, especially the posterior lobe—or from a trauma, as in Franck's case, and their own; (7) effect of hypophyseal extract on the polyuria of diabetes insipidus.

Pituitary Tumor with General Edema in Two Cases of Nanism, One of the Paltauf Type, the Other of the Pituitary Type. The two cases reported by Walter M. Kraus[8] are in many ways very puzzling. Both cases are instances of arrested development, starting very early in life, exactly when is a matter which we can not discover accurately. One patient is a very typical dwarf of the Paltauf type, whose arrest of development

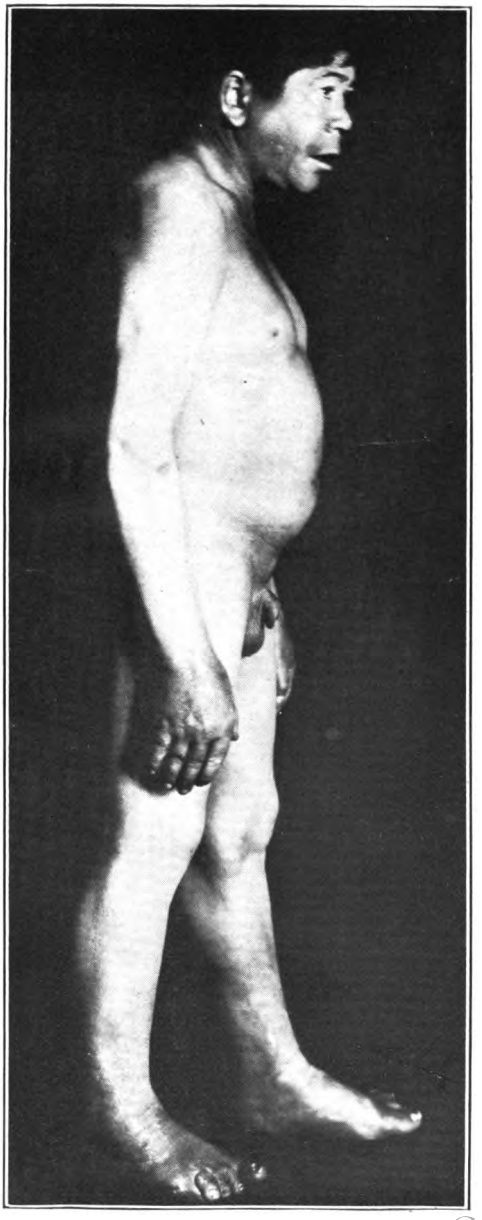
(8) Jour. Nerv. and Ment. Dis., March, 1917, p. 193.

began about the fifth year. The other is certainly not of the Paltauf type, but resembles the pituitary type. That he is not eunuchoid but rather infantile in form is shown by the relations of the upper to the lower length.

Both patients showed a very curious condition, generalized edema *without* renal involvement, or as Kraus prefers to call it, *adiabetes*.

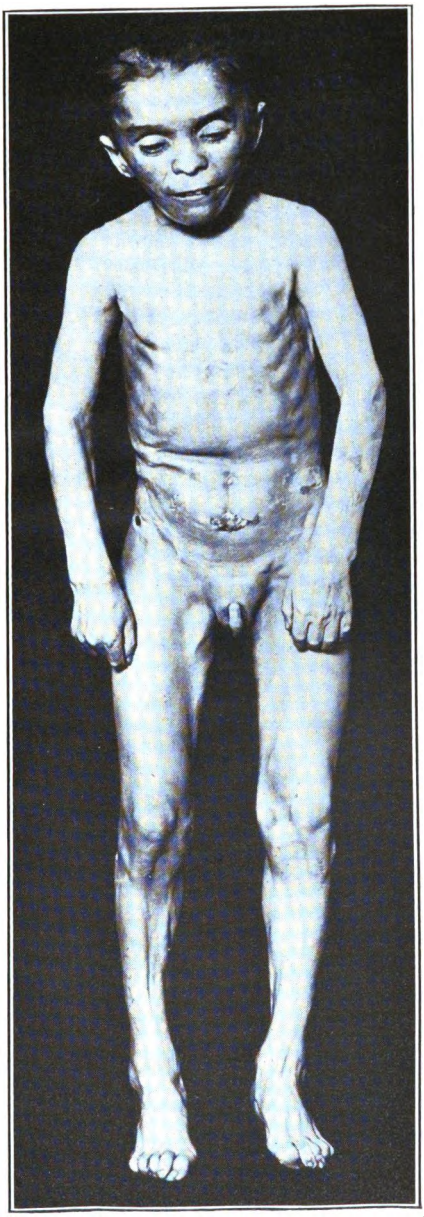
The occurrence of a condition which in many ways resembles myxedema is of no small interest from a theoretical as well as a therapeutic viewpoint. Cushing has not failed to make note of mild instances in many cases. He also remarked upon the condition in the general discussion. In one case there is little doubt of its etiology. It did not pit like ordinary edema in the first case (O. T.), and did not pit at all in the other (G. F.). It was unaccompanied by any involvement of the kidneys worth considering. Pathologically, O. T.'s kidneys were practically normal. The phenolsulphonephthalein tests were normal in both cases, which is additional evidence. The accumulation of nitrogenous waste products in O. T. was due to renal insufficiency, not to nephritis. His total intake during thirteen days was 19,500 c.c. and his output one-tenth of this. *The edema disappeared on the day that a total anuria occurred.* It would seem that water secretion had stopped. The posterior lobe was inactive. Furthermore it seemed that the posterior lobe inactively caused an oliguria (one-tenth output).

Before leaving G. F., the second patient, a brief analysis of the case seems in order. First, there is evidence of a deficiency in the posterior lobe of the pituitary, high carbohydrate tolerance, mild obesity and edema. There is a moderate deficiency of the anterior lobe, dwarfism. Second, there is evidence of a deficiency of the interstitial glands, undeveloped sex organs, unclosed epiphyses, absence of secondary sexual characteristics (hair), infantile fat distribution and infantile form. Third, there is evidence of a deficiency of the thyroid, dwarfism, obesity, carbohydrate tolerance, metabolism. Fourth, there is possibly a deficiency of the chromaffin



Case G. F. Note stooped, anthropoid-like posture, long arms and facial profile—Kraus, page 123.

PLATE XII.



Case O. T. Postmortem. No edema. Note genitals and cretinoid face page 123.

tissues—low blood-pressure and pigmentation. The adrenal cortex may also be deficient, sex organs, growth. There is no evidence of disease of the parathyroids, pineal, thymus or pancreas. The origin of the condition may be either a primary hypopituitarism from tumor, perhaps a teratoma, with secondary changes in the thyroid, sex and adrenal glands; or it may be a polyglandular disease originally of nonendocrinous origin. Kraus is inclined to believe in the tumor hypothesis.

In O. T., there was certainly no posterior lobe at autopsy. Clinically there was a lack of sweating, and edema with a history of abnormal liking for sweets (high carbohydrate tolerance). As to the anterior lobe, it was defective pathologically, and clinically; there was defective growth. The interstitial glands were not defective, yet there was failure of ossification, general hypoplasis, hair distribution. The thyroid showed no large amount of colloid, yet the skin and cretinoid appearance are suggestive of hypothyroidism. The adrenal cortex did not show much abnormality, how far it played a rôle Kraus thinks can not be stated. Certainly there were defective genitals, hair and growth. As to the chromaffin tissues, clinically there was low blood-pressure, slow pulse and slow respiration. The thymus was absent, the parathyroid, pineal and pancreas were not involved clinically. Here we have defective pituitary, infantile sex glands and thyroid. What was the underlying cause of it all Kraus can not say definitely. The evidence at autopsy inclines him to lay the blame on the pituitary gland (Plates XI and XII).

A Study of the Lipin Content of the Liver in Two Cases of Dyspituitarism. In the reference of two cases of hypopituitarism reported by Alfred Scott Warthin[9] there occurred a peculiar intraperipheral necrosis unlike all previously discovered forms of zonal liver necrosis. Associated with this necrosis is a reparative fibroplastic proliferation giving rise to an early intralobular cirrhosis.

In hypopituitarism there is a peculiar obesity due to infiltration of the various cells of the body with a mix-

(9) Jour. Labor. and Clin. Med., November, 1916, p. 73.

ture of lipins—glycerol-esters, cholestrol-esters. This condition of glandular liposis is especially marked in the liver and adrenals, but is scattered all over the body. With deficiency of hypophyseal functions there appears to be associated a cholestrol retention and infiltration. Hypopituitarism must, therefore, be classed among the xanthelasmic conditions, and is related in kind to diabetic liposis and Gaucher's disease. The hypophysis is either directly or indirectly concerned with lipin metabolism, particularly with cholesteatosis. Post-mortem hyperpyrexia may be associated with hypopituitarism and the obesity result from the latter condition.

A Case of Infundibular Tumor in a Child. An account is given by L. Newmark[1] of a boy who died at the age of 14 years after having diabetes insipidus continuously for about five years.

Signs of a tumor appeared only about two weeks before death; whence the admonition against assuming the "functional" nature of a diabetes insipidus even after some years have elapsed without definite tumor symptoms. A craving for alcoholic drink and unusual tolerance of it in diabetes insipidus are recorded. There is a need for more observations on the effects of drugs in this disorder.

A tumor occupying the region of the infundibulum, extending forward through the lamina terminalis, between the frontal lobes, and backward into the third ventricle and destroying the neurohypophysis and most of the pars intermedia, accounted for the diabetes insipidus. There was also atrophy of the pineal body.

A survey of the literature confirms the view that a tumor causing diabetes insipidus is commonly situated in, or near, the neurohypophysis, but occasionally in the pineal body. It does not appear from clinico-pathologic observations that it is over production of a diuretic substance that causes diabetes insipidus.

A Contribution to the Symptom Complex Associated with Interpeduncular Tumors. H. I. Gosline[2] presents a case of a male of 30 years with eight months' duration

(1) Archiv. Int. Med., April, 1917, p. 550.
(2) Jour. Nerv. and Ment. Dis., April, 1917, p. 337.

characterized by drowsiness of such persistence that he lost various positions. He died with signs of interpeduncular tumor.

The tumor was made up of undifferentiated anterior lobe cells such as are found in the hibernating animal and a correlation is suggested between tumors of this sort and the possibility of human hibernation.

It now appears that somnolence in an individual with other of the cardinal signs of hibernation may point to a special sort of disorder of the anterior lobe of the pituitary, just as a peculiar distribution of fat in the body together with hypoplasia (dystrophia adiposogenitalis typus Fröhlich) and high sugar tolerance unquestionably points to hypopituitarism. It will be seen that this assumption is based only on the association of asthenia and somnolence with a tumor whose cells resemble the undifferentiated cells of the hibernating animal. The idea of cause and effect between two associated conditions is recognized as one of the most naïve and it may be that more critical study later will reveal that the association is merely a chance one.

Study of One Hundred Selected Cases of Pituitary Disease. Isador Abrahamson, and Hyman Climenko[3] conclude that the posterior and middle lobes of the pituitary gland secrete a substance or substances which, according to their observations, have the following among other properties:

1. It does not influence sugar metabolism (sugar tolerance is not a sign characteristic of pituitary disease).
2. It controls the salt content on which the electrical conductivity of the blood depends.
3. This control is not exercised through the nervous system.
4. Disease of the posterior and intermediate portion of the pituitary gland disturbs the fixed ratio of the salt content of the blood which the secretion or secretions of that gland normally maintain.
5. Slight disturbance in the control induces alteration in the salt content of the blood and leads to polyuria,

(3) Jour. Amer. Med. Ass'n., July 28, 1917.

if there is renal sufficiency, or to a water-logging of the tissues, if there is renal insufficiency.

[Hypophyseal diseases are extensively referred to in the Practical Medicine Series, Vol. X, in 1913, 1914, and 1916.—Ed.]

The Cerebellum.

A Cyst in the Cerebellum. Düring[4] reports a case of cyst in the cerebellum in a woman 32 years old. She had been healthy since childhood except for occasional pains in the back of the neck. For four or five months she complained of considerable headache, dizziness, vomiting and the general symptoms of brain tumor. While being prepared for operation she succumbed to respiratory paralysis. At necropsy, a cyst was found in the left cerebellum. To the edge of the cyst was a small glioma, which probably was a remnant of a large tumor. In this case there were present homolateral ataxia with hypotonia, cerebellar vertigo and total paralysis of the left vestibular nerve, which was accompanied by a total left facial palsy. There were slight paralyses of the left abducens and spontaneous, coarse, horizontal, rotary nystagmus toward the left side, which was increased on looking towards the left. The tongue was protruded in the middle line. There was some hyperplasia in the region of the left trigemina. Düring considers the differential diagnosis between cerebellar cysts, chronic hydrocephalus, frontal lobe tumors and serous meningitis. Puncture of the brain seems to be the only safe means to differentiate between cysts and tumors. Furthermore, it has given good therapeutic results in some hands. Düring calls attention to the fact that internal hydrocephalus in these cases is largely situated in the occipital lobe and that, furthermore, the occipital lobe stands puncture very well.

Diagnosis and Prognosis of Cerebro-Cerebellar Diplegia. In review of the type of cases L. Pierce Clark[5] reported four years ago, he says that congenital cerebro-cerebellar diplegia is the term used for a combination of

(4) Corr.-Bl. f. Schweiz. Aerzte, Aug. 18, 1917, p. 1057.
(5) Archiv. Diagnosis, April, 1917, p. 211.

symptoms dependent upon cerebellar agenesis or to some form of injury to the cerebellum, at the time of or before birth, the exact nature of which has not yet been determined. The disorder presents varying types of symptoms which may be grouped roughly into those of flaccid and flaccid-spastic palsy, shading into the general mildly spastic state. The latter associated with cerebellar symptoms has been carefully described by Batten as congenital cerebellar ataxia. The severest type of cerebro-cerebellar diplegia is embraced in his group of cases described four years ago. In the pure cerebellar ataxia type there are hypotonia, dysmetria, gross incoordination, astasia, abasia, dysarthria, occasionally dysphagia and often complete inability to sit up because of extreme trunk ataxia. In the extreme involvement of the forebrain, the foregoing cerebellar symptoms are present together with mutism and the lowest grade of idiocy. In this latter group type there may or may not be evidence of involvement of the pyramidal tracts. In the mixed types of the association syndrome (cerebro-cerebellar type), there may be either a slight degree of spasticity in certain parts combined with hypotonia, or flaccidity in other parts of the body.

The prognosis of all these varying types depends, of course, upon the combination of symptoms presented. It may be fairly stated that when the forebrain is damaged to such an extent that the mental state is no longer to be classed as retardation, but shows mental arrest or marked imbecility, such children usually never recover either from their ataxia or from their defect in mental development.

In conclusion it may be said that the essential principle of training for these children is to use: (1) A general training in games, sports, and a broad concrete system of physical and mental education; (2) at the same time employ a special training in physical gymnastics to teach the use of segmental movements of all sorts, and finally (3) give the child a thorough understanding of the rhythmic continuity of all the different

segmental movements combined in a full purposive act, be it simple or complex, or fully coördinated with other bodily acts (diakonesic).

DISEASES OF THE SPINAL CORD.

Toxic Affections.

Experimental Toxi-infection of the Central Nervous System. This communication is a continuation of the experimental work which David Orr and Major Rows[1] have been carrying on upon the action of the bacterial poisons on the nervous system.

In brief, the results of their former experiments may be stated as follows: Lymphogenous infection produces an inflammatory lesion of the central nervous system, while in the hematogenous variety inflammation is reduced to a minimum. They drew attention to the implication of the sympathetic system in abdominal operations, but did little more than hint at its rôle in the causation of cord lesions. Certain conclusions were drawn; *viz.:* that general paralysis and tabes dorsalis were lymphogenous infections; and that the non-systemic degenerative lesions found in cancer cachexia, pernicious anemia, and Addison's disease, came under the head of hematogenous infections.

In the present experiment the research has been directed toward the brain, and the capsule containing a culture of the *Staphylococcus aureus* was placed in contact with the common carotid artery in the neck.

They found the same hyalin thrombosis in the vessels of the brain as was found in the cord when the capsule was placed in the abdominal cavity.

The lesions in the brain agree anatomically with what was observed in the spinal cord in an earlier series of experiments on animals, when, after the abdominal cavity had been infected by toxins the myelin was found degenerated around the margin of the cord and on either

(1) Brain, Vol. 40, Part 1, 1917, p. 1.

side of the postero-median septum, while the central portion, including the grey matter, remained intact. "If we substitute grey for white matter in the two series of experiments the anatomic distribution of the morbid lesion is essentially similar, *i. e.*, the peripheral portions of the central nervous system subserved by branches from the pial vascular system are affected.

"The morphologic character of the lesions in the brain point very clearly to a disturbance of the circulation and therefore of nutrition . . . the cause of the disturbance of the circulation is to be found in the morbid condition of the cerebral vessels, which are dilated, engorged, and show many varieties and degrees of hyalin degeneration of their contents."

It is their belief that whatever our present knowledge may be from the anatomic side, of the ultimate distribution and connection of the cerebral vascular system, they are justified in assuming from morbid lesions that there is a difference in the two systems which subserve the grey and white matter respectively.

They point out that there are present lesions of two types which illustrate how two factors, degree and situation, can produce dissimilar pathologic results although the pathogenesis is the same; and if we apply this to clinical neurology it becomes apparent that certain nervous syndromes, although widely different in symptomatology are pathogenetically one and the same disease. The difference in symptomatology is in large measure due to the anatomic side of the lesion; but the degree to which the nerve structures are involved is an equally important factor.

"One of the practical applications of these experiments is that they throw light upon the genesis of those infantile cerebropathies which are now regarded as the result of toxi-infections of medium or even slight intensity, contracted as a rule between the fifth and eighth month of fetal life or in early infancy."

[Former work of Orr and Rows may be found in the Practical Medicine Series, Vol. X, 1913, p. 104; 1914, p. 88, and 1916, p. 124.—Ed.]

Traumatic Affections.

Compression Fracture of the Fifth Lumbar Vertebra. Compression fracture of the fifth lumbar vertebra is described by James K. Young.[2] It is usually the result of a fall, the patient landing violently upon the buttocks in a sitting position, the body being flexed. If the strain is too great for the intervertebral discs, compression results. In this respect it differs from compression fracture in other parts of the vertebrae, which may be due to direct violence as well as to hyperflexion. The position of the fifth lumbar vertebra makes it especially susceptible to such injury; below is a firm unyielding base, and above it must sustain the body weight.

The symptoms of compression are: Pain upon movement, local tenderness, protective spasms, limitation of motion, and absence of paraplegia. The *x*-ray findings are characteristic. If complicated by ligamentous injuries, the patient will have symptoms characteristic of railway spine, reflex spasm upon the slightest movement or touch, etc. If complicated by displacement of the sacro-iliac synchondrosis, Kernig's sign may be elicited.

Pain in the lumbar region is constant and is increased by any movement which shifts the superincumbent weight of the body. Sitting down or rising from a sitting position increases pain. Changes of position afford temporary relief. Limitation of motion from protective spasm is not a symptom of compression, but is due to ligamentous injury or fracture of the processes or arches and may be absent in compression of the bodies. Scoliosis with the convexity toward the compressed side is a constant and important objective symptom. Later a secondary compensatory curve develops.

Disalignment of the spinous processes is an invaluable sign and one that is usually present. Among symptoms to be noted are rectal pain and spasm. *X*-ray diagnosis is the final means of determining the presence of compression or compression fracture.

It must be differentiated from: (*A*) Fractures of the transverse process of the fifth lumbar vertebra; (*B*)

(2) New York Med. Jour., Nov. 18, 1916, p. 982.

displacement of the ilium; (*C*) rotation of the lumbar vertebrae; (*D*) lateral deviation in Pott's disease; (*E*) rickets of the pelvis; (*F*) malignant disease of the fifth lumbar vertebra or sacrum; (*G*) arthritis deformans of the lumbo-sacral articulation.

Early treatment consists in traction in bed, by the head and feet—the patient being upon a hard mattress, or lying in a body-cast, like Lorenz's shell, or, as it is sometimes called, Stehbett. After the symptoms subside, the patient should be fitted with a spinal brace, having lateral uprights and crutches under the arms.

Fracture of the Spine. Symptoms of cord injury in fracture of the spine are said by Norman Sharpe[3] to be due to the following factors:

1. Fragments of displaced bone causing contusion or laceration of the nerve fibers, or a narrowing of the canal by the fractured laminae or a projection backward of a vertebral body, causing compression of the cord.

2. Hemorrhage either into the cord substance (hematomyelia), causing laceration of the fibers, or hemorrhage around the cord, either intradural or extradural, causing compression of the cord.

3. Edema both within and around the cord, causing compression of the fibers.

4. Narrowing of the spinal canal at the site of injury by new-bone growth or the formation of scar tissue.

These factors operate singly or in combination. It is only in rare cases and in the slighter injuries that these factors operate singly. In the majority of fractures of the spine, two or more, and at times all, of these factors are seen.

Operation should be done as soon as the symptoms of shock have passed away. Even if the symptoms of cord injury are but slight, if progressive, laminectomy should be done and the dura opened to allow of drainage of whatever hemorrhage may be present and to ward off by this spinal "decompression" the effects of the edema which invariably follows injury to the cord, and which is so destructive to the delicate fibers.

(3) Amer. Jour. Med. Sci., December, 1916.

In the author's opinion, early laminectomy in skilled hands is the best treatment by far in fracture of the spine with cord lesions, and the only contraindication to operation is a bony deformity so great as to show beyond doubt that the spinal canal is obliterated and the cord hopelessly crushed.

He gives the following reasons for and advantages of early laminectomy:

1. It relieves pressure from cord whether due to depressed bone or blood clots.
2. In fracture-dislocation, it allows cord ample room, relieving pressure effects of angulation.
3. It provides drainage of the certain edema, which by its compressive effects is destructive to the nerve fibers.
4. It allows for drainage of hemorrhage, if present, the compressive effects of which may be so great as permanently to damage the cord.
5. In skilled hands, laminectomy is not a difficult or dangerous operation, and by doing it early the surgeon has given the damaged cord the best possible chance for repair.

Injuries to the Spinal Cord Produced by Modern Warfare. In an article based on the study of thirty patients, C. Burns Craig[4] says that laceration of the spinal cord causes paraplegia, quadriplegia, or cauda equina symptoms. The patients manifest cystitis, pyelonephritis, and general sepsis with a fatal termination within nine months.

Concussion of the spinal cord presents a brighter picture. Concussions with hematomyelia, causing paraplegia or quadriplegia, may follow the impinging of a bullet or shell fragment upon the vertebra without producing fracture of the latter. Such cases present all grades of sensory and flaccid motor paralysis and usually end in entire recovery. The degree and the rapidity of recovery are in some instances amazing.

The initial physical signs of contusion and concussion of the spinal cord may be identical, but an interval of

(4) New York Med. Jour., Nov. 25, 1916, p. 1036.

twenty-four hours is usually sufficient to differentiate the conditions.

Concussion is usually characterized by more profound motor than sensory paralysis.

Concussion is attended by numbness and tingling in the extremities affected.

Contusion of the caudal segments of spinal cord involving the cauda equina is associated with lancinating tabetic pains in the lower extremities.

A stereoscopic roentgenographic examination of the spine is valuable, almost essential.

When the lesion includes the cord and spinal roots, the symptoms are referable to the segment of the cord which gives off the highest spinal root involved. The anatomic lesion is therefore several segments below the physiologic.

When the cord only is involved, the anatomic and physiologic lesions are identically situated.

Concussion with hematomyelia frequently results from the missile striking against the vertebra. Paralysis caused by this condition usually recovers rapidly and entirely.

Contusion or laceration of the spinal cord by actual contact with the missile, does not usually improve and is eventually fatal. Bedsores, cystitis, pyelonephritis, and sepsis form the usual course of the disease.

A patient with contusion of the cervical region of the spinal cord seldom survives long enough to reach the base hospital.

A Case of Spinal Injury. The patient was found by K. S. Lashley[5] to have, along with other sensory paralyses, complete anesthesia to passive movements of the left knee-joint, provided these movements were not made with rapidity. There was no paralysis of the muscles acting on the knee-joint. The opportunity was thus given for testing how far the accurate exclusion of movements is possible, particularly from the information received from the sensory stimulus of the moving part itself. It was found that the control of movements was scarcely less accurate than those in a normal

(5) Amer. Jour. Physiol., Vol. 43, 1917, p. 169.

subject tested in the same manner. There was no evidence that any process of training had contributed to the control. The quicker the movement the more accurately was it made, but this accuracy was relatively independent of the duration of the movement.

The Bladder in Gunshot and Other Injuries of the Spinal Cord. Based on the study of 111 cases treated in the Star and Garter Hospital, and 339 cases at the King George Hospital, J. W. Thompson Walker[6] describes four bladder states which are often associated with injuries of the spinal cord: (1) Retention of urine from paralysis of the detrusor muscle leading to (2) retention with overflow (passive incontinence), where only the surplus beyond a certain large accumulation escapes; (3) periodic reflex micturition (active incontinence), where a reflex discharge of urine takes place whenever a certain quantity accumulates—the condition is that of the nervous bladder, cerebral control being absent; (4) paralytic incontinence, where the bladder is flaccid and the sphincter atonic. The urine dribbles away from the bladder without accumulating. This is said to occur when the lumbar centers are destroyed. Complete retention was found to occur, at the commencement, in all cases in which micturition was affected at whatever level the injury might be and it occurred in cauda equina lesions as well as in cord lesions. Periodic reflex micturition is the second phase in all lesions of the cord, not excepting those of the lumbar enlargement. It develops in more than half the cases of the cauda equina lesion, but occasionally voluntary micturition follows directly on a period of complete retention.

The treatment of the urinary tract in paraplegia resolves itself into two chief lines: (1) Provision for removal of the urine, and (2) treatment of septic complications. He recommends early and continuous drainage of the bladder and advises against continuous urethral drainage by catheter. A prophylactic suprapubic cystotomy should, according to Walker, be performed at the earliest possible moment before any catheter has

(6) Lancet, Vol. 192, Feb. 17, p. 173.

PLATE XIII.

FIG. 48—Upper C_2

FIG. 49—Lower C_2

FIG. 50—Upper C_3

FIG. 51—Lower C_3

FIG. 52—C_5

FIG. 53—C_6

FIG. 54—Upper C_8

FIG. 55—D_1

FIG. 55—D_4

FIG. 57—D_6

FIG. 58—D_{10}

FIG. 59—L_2

FIG. 60—L_4

FIG. 61—S_1

FIG. 62—S_2

FIG. 63—S_5

Disseminated sclerosis. Cross sections of cord at various levels stained with Kulschitzky-Pal's modification of Weigert's ingelin sheath stain. Characteristic irregular distribution of lesions—Dawson, page 137.

been introduced and the bladder drained continuously until the second stage of active incontinence is reached.

The Syndrome of Cranio-Spinal Hypertension Following Contusions of the Cervical Vertebrae. Attention is drawn by Henri Claude and H. Meuriot[7] to a syndrome occurring in subjects who have received a violent traumatism of the posterior cervical region which has caused contusion or more or less concussion of the cervical spinal cord. Sometimes there is also present a partial fracture of a vertebra. After a rather long period the following syndrome appears:

1. General signs of intracranial hypertension, *viz.*, headache, vomiting, vertigo, venous hyperemia of retina or papillary stasis, and signs of labyrinthine irritability, etc.

2. Localized signs of nervous or radicular compression, due to increased pressure of the cerebrospinal fluid in the cervical region; *viz.*, signs of sympathetic irritation (occulo-sympathetic syndrome, exophthalmus, mydriasis), sensory disturbances in certain cervical root areas, and especially in the first thoracic and the lumbosacral root areas, with consecutive changes in the tendon-jerks. Lumbar puncture quickly leads to recovery.

Three cases of this syndrome are detailed; the authors think that too little attention has been paid to spinal hypertension, and point out that unless the importance of spinal hypertension is realized one would be tempted to attribute the whole symptomatology to a medullary or radicular lesion for which one would not think of surgical operation.

Multiple Sclerosis.

The Histology of Disseminated Sclerosis. In the endeavor to interpret the histologic observations and to correlate the various conceptions which emerge in the process, James W. Dawson[8] roughly estimates the factors which have been at work in the pathologic process of disseminated sclerosis.

(7) Abstracted from Prog. méd., December, 1916, in Rev. Neurol. and Psychiat., July, 1917, p. 240.
(8) Edinburgh Med. Jour., December, 1916, p. 377.

He is not in agreement with Müller's view, that the areas in disseminated sclerosis arise solely on the basis of an increasing glia hyperplasia, and that they can always be separated from those arising on the basis of an inflammatory reaction.

It is suggested:

(*a*) That fleeting early motor paralyses and psychic symptoms may be related to the presence of areas in association paths; that remission of these symptoms is possible, due to the linking up of new paths; and, further, that the variation of the symptoms in all stages of the disease emphasizes the importance of the mental factor in the symptomatology.

(*b*) That the cortical areas share in the production of psychical symptoms; but, probably, when these are defined they are dependent on the inhibition of the action of those cortical cells which control the thalmic centers—the latter being intimately related to the emotions and forming part of Langley's autonomic system. Such inhibition would take place by the presence of subcortical areas in relation to the corticopetal fibers and to the presence of areas in the optic thalamus itself. Reference has already been made to the possibility that early psychical symptoms, such as restlessness, emotionalism, involuntary fits of laughter, may, together with the early transient palsies, be referred to a functional change which precedes an anatomical, structural change.

(*c*) That volitional tremor, alterations in speech, and nystagmus, which are all largely due to want of coördination, may be the results of sclerosis spreading in from the several ventricles and the aqueduct.

In a later article, this author[9] describes in detail the structure of areas of different types in disseminated sclerosis, the characteristics in special situations and changes in the individual tissue elements, and some other histologic features of this disease. In describing the structure of different types of areas, he calls attention to a sequence of changes, which may be

(9) Rev. Neurol. and Psychiat., February, March, April and May, 1917.

briefly described in the following terms, which characterize their dominant feature.

1. That of the commencing reaction of all the tissue components.
2. That of the glia cell proliferation and commencing fat granule cell formation.
3. "Fat granule cell myelitis."
4. That of commencing glia fibrile formation.
5. That of an advancing sclerosis.
6. That of a complete sclerosis (Plate XIII).

Etiology of Disseminated Sclerosis. In 200 cases reported by Byron Bramwell,[1] 111, or 55.5 per cent., were females and eighty-nine, or 44.5 per cent., were males. No less than sixty-seven, or 33.5 per cent., commenced between the ages of 21 and 25 years (inclusive); 130, or 65 per cent., between the ages of 16 and 30 years (inclusive); and 157, or 78.5 per cent., between the ages of 16 and 37 years (inclusive). In one of his cases the disease commenced at the age of 2, in one at the age of 7, in one at the age of 10, in two cases at the age of 11, in two at the age of 13, and in two cases at the ages of 14 and 15 years respectively. In only five of the 200 cases did the disease develop (or appear to develop) after the age of fifty, *viz.*, at the ages of 52, 54, 56, and 58 years respectively. In 129 of the 192 cases in which the condition as regards marriage is mentioned in the notes, the patients were unmarried when the disease commenced (when the symptoms were first noticed).

In none of his 200 cases did the disease appear to be directly inherited, but a daughter of one of his female patients and the son of another female patient are said to be suffering from the disease. In comparatively few cases did the patients come of a nervous stock; in the majority of cases the patients were, prior to the development of the symptoms, non-nervous, healthy young men and women.

Two of his patients are sisters; in one case the brother of one female patient also suffers from the disease.

(1) Edinburgh Med. Jour., Feburary, 1917, p. 96.

The occupations of the patients did not have any special influence on the production of the disease.

Syphilis and gonorrhea do not seem to have any influence in exciting or causing the disease. In 120 cases in which some condition or another (such as a febrile or infectious disease, mental worry, trauma, fatigue, etc.) appeared to be, or was supposed to be, the cause of the disease, the nature of that supposed cause was most diverse. It is certain that in many of these 120 cases the supposed cause was not in reality the starting-point of the disease but was merely an aggravating condition. In several cases in which a definite cause (such as influenza, a chill, mental worry, traumatic injury, etc.) was said to be the starting-point of the disease, careful investigation showed that some symptoms, such as diplopia, giddiness, temporary numbness, etc., had been present before the alleged cause came into operation.

"It is no exaggeration, I think, to say that in at least half of the 200 cases there was no obvious cause for the disease. Of the two theories:

"1. That the sclerotic lesions are the result of some irritants which is distributed through the nerve centers by the blood-vessels, and

"2. That the disease is due to some developmental or congenital defect of the neuroglial or nervous tissue (perhaps similar to, or analogous to, the gliomatosis in cases of syringomyelia) which renders it more vulnerable or liable to be affected by irritation than the neuroglial or nervous tissue of the normal individual."

He says that the facts that disseminated sclerosis is occasionally met with in young children; that in some cases in which the disease develops in adult life some symptoms have been present from childhood; that the age-period at which disseminated sclerosis and syringomyelia are most frequently developed is very similar; that both conditions often seem to have their starting-point in some acute febrile disease, traumatic injury, etc.; and the difficulty of satisfactorily accounting for the production of the disease (disseminated sclerosis) on any other theory seem in favor of this view.

The Prognosis in Disseminated Sclerosis: Duration in Two Hundred Cases. In the majority of cases disseminated sclerosis, sooner or later, causes death; consequently, according to Byron Bramwell,[2] the ultimate prognosis is extremely unfavorable.

The duration of the disease varies greatly in different cases. The course is usually slow and chronic—the disease may last for thirty or more years before the fatal termination is reached; in rare cases it pursues a rapid course. In a few rare and exceptional cases the disease seems to be permanently arrested, and a cure, or what is, practically speaking, a cure, takes place.

In some cases the symptoms, once they are developed, pursue a progressive course from bad to worse; but in many cases the downward progress is from time to time interrupted by periods of improvement or complete remission of the symptoms. In some cases the symptoms (giddiness, numbness, diplopia, incoördination, loss of power, dimness of vision, nystagmus, volitional tremor, speech affection, etc.) entirely disappear, or almost entirely disappear, for a time. These periods of improvement and remission are very deceptive, for they may lead one to give a favorable prognosis, and, if any special plan of treatment is adopted, to attribute the amelioration to that treatment. Unfortunately, experience shows that, in the majority of cases of this kind, the improvement is merely temporary. Everyone who has had much experience of disseminated sclerosis knows that although the patients often improve, and, in some instances, apparently for a time get quite well, it is only in very rare instances that the improvement is lasting. The majority sooner or later relapse. In very rare cases the improvement is so marked (the symptoms completely disappearing) and so prolonged as to warrant the belief that a permanent arrest or cure has taken place; and it seems only reasonable to suppose that in a disease like disseminated sclerosis, in which the symptoms may entirely disappear for a time (for several months or years), permanent arrest and a cure

(2) Edinburgh Med. Jour., January, 1917, p. 16.

would occasionally occur. The wonder is that permanent arrest and cure do not more frequently take place.

In some of the rare cases in which the symptoms completely disappear and permanent (?) arrest of the disease seems to take place, optic atrophy or the Babinski sign remains; but these conditions are to be regarded as results rather than active manifestations of the disease.

Bramwell has carefully analyzed the results in 200 of the cases which have come under his observation in hospital and private practice. One hundred six of the 200 patients have died; sixty-four are known to be still alive; and in 30 the result is not known. Of the sixty-four patients who are known to be still alive, forty-two are much worse, twelve are *in statu quo,* seven are greatly improved, and three quite well. In the 106 in whom the disease proved fatal the average duration was 10 years and 8 months; the shortest duration was 7 months, and the longest duration was 37 years. The average duration of the disease in these 170 (fatal and non-fatal) cases is, up to the present date, 12 years and 1 month. In one case the duration of the disease was 37 years, and in no less than 14 cases the disease has lasted for more than 25 years. In the 106 fatal cases, in twenty three, or 21.6 per cent., the disease terminated in less than 5 years; in fifty-four, or 50.9 per cent., in less than 10 years; in seventy-eight, or 73.5 per cent., in less than 15 years; and in ninety-two, or 86.7 per cent., in less than 20 years.

The Early Recognition of Multiple Sclerosis. In the series of thirteen cases reported by Leo M. Crafts[3] no possible causative factors, even remote, could be found in six. Quite severe trauma had occurred in two, but in each case it antedated the initial symptom by a period of two years, too far in the past to be rationally included as a cause. In two others there had been exposure, one incidental to a country practice and the other to a farmer's life, while with two that gave a history of previous infectious disease, years had intervened.

(3) Jour. Amer. Med. Ass'n., Oct. 6, 1917, p. 1130.

In sharp contrast to the entire uncertainty of all initial etiologic factors is the clear and striking influence of trauma and the puerperium in promoting the recrudescence of symptoms.

Amyotrophic Lateral Sclerosis. A pathologic study of an early case is presented by John H. W. Rhein.[4] The changes in this case consisted only of atrophy of the anterior horn cells and of the cells of the nuclei of the twelfth pair of nerves in the medullar oblongata, degeneration of the anterior roots, and slight change in the crossed pyramidal tracts in the lumbar region. The change in the white matter otherwise was insignificant and probably without importance.

In the case presented, the symptoms of unusual character were the rapid progress of the atrophy, implicating at the end of a year the entire musculature of both arms and hands, the muscles of the shoulders and the tongue, and the increased knee jerks, and arm jerks, in spite of the extreme atrophy. Clinically, this differs from the spinal form of progressive muscular atrophy, in which the atrophy takes years to advance to the degree seen in this case, and in the presence of increased leg and arm reflexes.

The symptoms, which in this case suggest amyotrophic lateral sclerosis in an early stage, consist of rapidly progressive atrophy, the early involvement of the bulbar nuclei which has been observed, though not frequently, the exaggeration of the reflexes, in spite of the absence of the Babinski and Oppenheim reflexes, which reflexes Raymond and Cestan state are usually absent and which according to Oppenheim may or may not be absent. The borderline character of this case is instructive and very important as connecting the cases of progressive spinal atrophy with amyotrophic lateral sclerosis. The pathologic findings in the case here described appear to be those of amyotrophic lateral sclerosis in an early period of its development, in which the pyramidal tracts had shown involvement merely in the lumbar region and then only to a slight degree.

(4) New York Med. Jour., May 19, 1917, p. 915.

Tabes Dorsalis.

Tabes Dorsalis. This note by Morris Grossman[5] is based on the study of 240 cases of undoubted tabes. He concludes that:

1. The average age of syphilitic infection, dated from the primary chancre, was 24.4 years.
2. The average age of the onset of tabes in 238 cases was 39 years.
3. No detectable difference exists in the age of onset of tabes in those patients treated with antisyphilitic remedies and the age of onset in those untreated or presumably less treated.
4. The average pretabetic interval is not greater than 14.6 years.
5. The pretabetic interval in the young may, but seldom does, last for a shorter period than in the more mature.
6. The resistance of the central nervous system seems to deteriorate with age.

In another study based on the same cases Grossman[6] concludes that:

1. The duration of the pre-ataxic period may be influenced by age.
2. The probable average pre-ataxic period is three years.
3. Women seem to have a shorter pre-ataxic period than men.
4. The average life-expectancy of the bedridden tabetic is very much longer than that usually taught.
5. The average age of the immobilized tabetic is 53 years.
6. Most tabetics usually perpetuate the ataxic stage; in the small percentage who become bedridden, owing to uncomplicated ataxia, the average duration of the ataxic period is 4.11 years.
7. Among those who become bedridden a short ataxic period usually follows a short pre-ataxic period. This substantiates Maloney's contention that the deteriora-

(5) New York Med. Jour., Sept. 1, 1917, p. 402.
(6) Med. Record, Aug. 18, 1917, p. 278.

tion of attitude is mainly mental and not structural deterioration. The short ataxic period in these bedridden cases is due to the same mental inferiority as is conducive to the short pre-ataxic stage.

Friedreich's Disease.

A Clinical and Anatomic Report of a Case of Friedreich's Disease. This important case of a patient aged 8 years is reported by W. F. Litchfield, Oliver Latham and A. W. Campbell.[7] The patient was one of a family of nine. One brother 14 years old died of this disease; a sister has twitching of the face; another brother 5 years old has ataxia; one brother is nervous and the others are healthy. The brother who died showed the onset of the disease to have occurred at the age of 6; the living brother, who is 5, showed swaying static and dynamic ataxia, slight ataxia of the hands, absent knee-jerks and some degree of pes cavus. The patient's symptoms began at the age of 6 when she walked, in a wabbly fashion, later became weak and thinner, and finally could not walk at all. She was irritable, emotional, and entered the hospital with oncoming typhoid fever from which she died. She had distinct ataxia, jerkiness of movements in the hands, inconstant nystagmus, a bilateral pes cavus, the knee-jerks were absent, some hypertonic of the muscles was present. Macroscopically, there was found a relative diminution of the area of the posterior columns of the cord and an increase in the ratio of grey matter to white. Latham says that there was a relatively old sclerosis affecting parts of the posterior tracts in which the interstitial tissue had assumed an unusual type, resembling that found in disseminated sclerosis, and irregular and less marked sclerosis of considerable duration was also present in the lateral regions of the cord. This sclerosis involved areas which did not corresond to sharply defined tracts and was associated with a much more recent degeneration. Only a few cells of Clarke's column, a few of the large cells of the post central gyrus and a few cells

(7) Med. Jour. Australia, Feb. 17, 1917, p. 135.

of the dorsal root ganglion were affected. The lateral columns were not severely sclerosed. The changes somewhat resembled those of "ataxic paraplegia," especially in the escape of the posterior root zones and ventral fields. Campbell accepts Williamson's view that the parts degenerate because they happen to lie in that section of the cord where the blood-supply is weak; *viz.*, in a field supplied by the posterior spinal system or arteries.

Acute Anterior Poliomyelitis.

Poliomyelitis. From a study of 717 cases of poliomyelitis during the 1916 Philadelphia epidemic, T. H. Weisenburg[8] makes a number of important conclusions. Of the 717 cases studied, 388 were males and 329 were females. There were 699 Caucasians and eighteen negroes. Of the 717 cases 456 occurred between the ages of 3 months and 6 years. There were thirty-seven cases in children under 6 months.

The symptoms may be classified as those of onset, the preparalytic symptoms and those occurring in the course of the disease in the paralytic stage.

Weisenburg can not recall a single case either with or without exacerbation of fever in which the paralysis became more marked after improvement had begun. A paralysis which tends toward increased destruction of function after improvement has been instituted should give grave doubts as to the etiology being infantile paralysis. Fever was the most common preparalytic symptom. In the majority of cases the paralysis followed the temperature curve and was proportionate to it. In uncomplicated cases the respiration rate was proportionate to the temperature.

Of nervous symptoms, twitching was seen in thirty-one, restlessness in fifty-eight, irritability in six, delirium in three, stupor in ten, convulsions in nine. It is interesting to note that in three of the ten hemiplegic cases the patients had convulsions. Sore throat was noted in twenty cases. Headache was noted in sixty-

(8) Med. Clinics of North Amer., September, 1917, p. 393.

one cases. Pain in the neck was noted in sixteen; pain in the back in twenty-one; pain in the abdomen in five; and in the extremities in one.

The objective preparalytic symptoms when observed consisted of stiffness of the head and neck with pain on motion. There was also rigidity of the neck muscles and often retraction of the head. General hyperesthesia was usually present.

In the preparalytic stage the reflexes were usually exaggerated, often with Babinski and Kernig; ankle clonus was not common. In other words, in most cases, preparalytic symptoms were those of meningeal irritation and were indistinguishable from a true meningitis.

A certain number of cases obviously heavily infected were classified as the so-called toxic cases. The following types were included under this head: (*a*) Cases in which there was a very short preparalytic stage characterized by a sudden onset and a very rapid progression of symptoms. (*b*) Cases in which there was a very rapidly spreading paralysis usually of the Landry type. (*c*) Cases in which the above two types did or did not exist, but which were characterized by the fact that the appearance of the patient denoted profound intoxication. (*d*) Cases which developed acetonuria and acidosis.

With remarkable uniformity the paralysis came on about the second or third day.

In the majority of cases pain in the back of the head and neck with an accompanying rigidity came on about the same time that the paralysis appeared. Often the pain preceded the paralysis.

Weisenburg is convinced that this pain is not at all of neuritic origin.

He also believes that the rate of improvement in any given extremity may be the same but that there is more marked improvement in the upper extremities when contrasted with the lower extremities. It is his belief that in the preparalytic stage prompt and frequent lumbar puncture is valuable for the mechanical relief of pressure and for symptomatic relief. He does not believe that it is of any value in the absence of

pressure and meningitic symptoms. In other words, it is of no value after the case has reached the stage of absent reflexes, flaccidity and paralysis. He is not sure of the value of intraspinal administration of adrenalin. He does not believe that immune serum has proved to be of any value, nor is he convinced of the value of any of the other agents ordinarily employed, such as urotropine, normal serum intraspinally or intravenously, mercuric chloride solution intraspinally, and solutions of arsenobenzol intravenously.

The Recent Epidemic of Infantile Paralysis. Among the cases observed by Haven Emerson,[9] the most constant symptom was found to be the acute onset of fever. The symptom one would think of next in seeing these children would be the change in the character of the child. It becomes more than usually irritable and is unwilling to be fondled or held.

He emphasizes the fact that the diagnosis is as important in the absence of paralysis as with paralysis, and the patient an equal—if not a greater—danger as a distributor of virus. He has considered as characteristic and diagnostic a cerebrospinal fluid which is clear with an appreciable increase in the cell count and globulin. He found that no single therapeutic agent proved so useful in giving prompt relief as lumbar puncture. It is only fair to add that there were patients who recovered from severe attacks without any withdrawal of fluid or any other than expectant treatment. Children beginning to develop contractures and children so uncomfortable that they could not sleep were much helped by warm baths and warm wrappings about their arms and legs. He calls attention to the fact that the muscles are essentially fatigued and must be rested for a long time, and any interference by massage, electricity, or mechanical contrivances is better postponed. During the quarantine period, which has been established in New York as eight weeks, the muscles rarely need manipulation of any kind.

It was found that deaths are pretty apt to come coincidentally with the height of the humidity, which

(9) Bull. Johns Hopkins Hosp., April, 1917, p. 131.

would be the case with almost any acute, infectious disease in children under 5 years of age.

He appends a report prepared with the approval of the Public Health Association in which may be found the following conclusions: Experiments have shown that the virus of poliomyelitis is present not only in the nervous tissue and certain other organs of persons who have died of this disease, but also in the nose, mouth and bowel discharges of patients suffering from the disease. It has been proved by similar experiments that healthy associates of poliomyelitis cases may harbor the virus in their noses and throats.

Poliomyelitis: The Preparalytic Stage and Diagnosis. Of all the symptoms noted in poliomyelitis, fever, according to John Ruhräh,[1] is the most constant. The second most notable symptom is the presence of pain, and in children old enough to locate the pain, headache is, next to fever, the commonest symptom. The pains may be in any part of the body and may be so marked as to overshadow all other features of the disease, or they may be so trifling as to be only elicited by special examination, with all gradation in between. The commonest pain next to headache, and of decidedly more value in diagnosis, is a tenderness and pain along the spine and down the legs reaching to the heels or even the soles of the feet, and another very common and suggestive pain is that in the neck and back of the head.

In the meningeal form, the patient may show a very characteristic sign at this time, or usually a little later, which may be described as follows: If the patient is raised by placing the hands under the shoulders the head will fall back. If the child is told to raise the head when it is sufficiently conscious, it will do so and hold it forward a moment or so and the head will again fall back. This is a sign of very great importance.

The cerebrospinal fluid in practically all cases, certainly in almost all if not all of the cases which show nervous symptoms, is abnormal and may present a number of different changes which, in the main, are con-

(1) Amer. Jour. Med. Sci., February, 1917, p. 178.

stant. The fluid is sterile, usually clear, and sometimes a slight fibrin web forms in it. The number of cells is definitely increased. The normal fluid contains from five to ten cells to the cubic millimeter, while in poliomyelitis the number of cells is increased from sixteen to twenty to 100, but in some instances this number is greatly exceeded, as high as 500 or over being encountered. In the early stage of the disease, before the paralysis has made appearance, the chief type of cell found is the polymorphonuclear. Sometimes they form from 80 to 90 per cent. of the cells present. After the appearance of the paralysis the cells found are chiefly lymphocytes, and from 75 to 100 per cent. of the cells present are of the mononuclear type. There is also the presence of large mononuclear cells of an endothelial type which have been regarded by DuBois and Neal as rather characteristic of poliomyelitis. There are also phagocytic cells present. The cells rapidly disappear from the cerebrospinal fluid, so that after the first two weeks the count is either normal or nearly so. The fluid is sterile, gives a positive Fehling's reaction like the normal fluid, and usually contains a very definite reaction for globulin, which is not, however, so pronounced as that found in the various forms of meningitis. During the first week, the globulin is found in perhaps one-half of the fluids examined. Pandy's test will, as a rule, be found easy and reliable. The globulin increases, as a rule, until about the third week, when it decreases, but a slight increase may be detected even after seven weeks or longer. The reaction to Fehling's solution is of slight value in diagnosis, inasmuch as in tuberculous meningitis and sometimes in meningitis due to other organisms, this power to reduce Fehlings' solution is absent. If the reaction is present it means nothing; if it is absent it is a point against poliomyelitis.

Early Symptoms and Diagnosis of Acute Infantile Paralysis. Louis C. Ager[2] concludes that it is quite possible to make a diagnosis in most cases of infantile

(2) Archiv. Diagnosis, April, 1917, p. 180.

paralysis before paralysis has occurred, provided a careful examination is made.

The essential diagnostic symptoms are: An acute febrile attack; sensory and motor excitability; semivoluntary antero-posterior spinal rigidity which relaxes to a great extent if the back muscles are properly supported. Finally, the customary changes in the spinal fluid, which he describes as an average cell count of 109, with 96 per cent. lymphocytes, a positive Noguchi in all but fourteen of seventy-one cases. Fehling reduction was always present with the high average of 83 mg. per 100 c.c. of fluid; urea, an average of 24.7 per 100 c.c. The fluids were none of them actually cloudy, but showed the ground-glass appearance described by Zingher. .

The Clinical Aspects and Treatment of Acute Poliomyelitis. In the opinion of Theodore Le Boutillier,[3] not enough stress has been laid on the abortive cases, many of which were never diagnosed, and it is to this cause that our high mortality rate of 29 per cent. can be attributed.

Lumbar puncture, not alone for diagnosis but also as a therapeutic measure, must be borne more constantly in mind and used to an even greater extent. Adrenalin chloride and immune serum, alone or in combination, constitute the most efficient treatment which has been evolved during this epidemic, and should be used whenever possible, only remembering, as in the case of diphtheria antitoxin, that the most beneficial results are obtained from its early use.

An interesting fact brought out in patients detained in the hospital after the regular period of quarantine had expired, owing to pneumonia or vaginitis, has been the improvement in the parts which were apparently completely paralyzed on the date on which these patients ordinarily would have been discharged.

An Anatomic Study of Fifteen Cases of Acute Poliomyelitis. The most important changes were found by W. B. Blanton[4] in the ganglion cells of the brain and

(3) Amer. Jour. Med. Sci., February, 1917, p. 188.
(4) Jour. Med. Research, March, 1917, p. 1.

cord. Injuries to these cells appeared to occur early and often were so severe as to cause their total destruction. There appeared to be evidence, in comparing ganglion cell changes with interstitial alterations, of the truth of the older view that these cells suffer with the first injury to the central nervous system. Among the interstitial changes in the cord, the presence of many cells with single elongated, often quite crooked nuclei, produces a pathologic picture peculiar to this disease. The cells entering into the perivascular accumulations contrast sharply with the cells of the more diffuse infiltration, having as a rule small, dense nuclei. The mechanical factors, edema, congestion, compression and the invasion of the tissues by wandering cells, do not appear to be primary. Hemorrhage in these cases did not seem to be the serious factor advanced by some investigators. Secondary degeneration of the myelin sheaths of the nerves probably occurs more frequently than has been supposed. The cerebral cortex uniformly showed no lesions. The burden of the injury appeared to fall on the cord and on the brain stem. The injury to other organs, while constant, was not characteristic of poliomyelitis.

Treatment of Epidemic Poliomyelitis with Immune Horse Serum. Forty-four patients with epidemic poliomyelitis have been treated by E. C. Rosenow.[5] Of these nine died, a mortality of 20 per cent. In the nine fatal cases, six patients were moribund, or in a dying condition from respiratory failure at the time the serum was given, and hence should not be included as treated cases. Of the thirty-eight patients in whom there was sufficient time for the serum to act, three died, a mortality of 8 per cent. Of these thirty-eight treated patient, twenty-two showed definite paralysis when the treatment was begun, and sixteen were in the preparalytic stage. Except the three fatal cases in the former group, paralysis appeared to be arrested in all but one, a boy 5 years of age, in whom a moderate paralysis developed in the left leg, the first injection of serum being given on the second day of the disease.

(5) Jour. Amer. Med. Ass'n., Sept. 29, 1917.

All of the sixteen treated before paralysis had begun recovered without paralysis.

These results are in sharp contrast to the twenty-three untreated cases which occurred during this epidemic; nine of these patients died, a mortality of 35 per cent.

It is realized, of course, that many more patients must be treated before conclusions can be drawn as to the exact value of this treatment. Of its harmlessness and apparent good effects, there can scarcely be any question. Rosenow states that at the time of writing this article, there was on hand enough serum to treat approximately 800 patients. Suitable quantities, he says, will be sent gratis on request to physicians or laboratories for reports of cases in localities where poliomyelitis now exists in epidemic form.

Specific Serum Therapy of Epidemic Poliomyelitis. A series of 159 cases of poliomyelitis were treated by John W. Nuzum and Ralph Willy[6] with immune serum prepared in the horse by repeated intravenous injections of the coccus isolated chiefly from human poliomyelitic sources. Prior to its use in man, they have proved that this serum prepared in the horse in the manner outlined possesses both protective and curative properties in experimental poliomyelitis in monkeys.

They conclude that:

1. Of 159 patients receiving serum in all stages of the disease, nineteen died, a mortality of 11.9 per cent. Among 100 cases occurring during the same period of time, in which the patients did not receive serum, thirty-eight patients died, a mortality of 38 per cent.

2. They have treated 152 patients in all stages of infantile paralysis, excluding seven cases presenting respiratory paralysis on admission, with eleven deaths—a mortality rate of 7.2 per cent. During this same period of time a total of 301 cases were reported to the Health Department with ninety-seven deaths—a mortality of 32 per cent.

3. This series of treated cases suffices to demonstrate the harmlessness of serum treatment when the serum is

(6) Jour. Amer. Med. Ass'n., Oct. 13, 1917, p. 1247.

free from hemoglobin, sterile to repeated cultures, and the injections are slowly made and all known rules of precaution are observed.

4. The serum appears to possess the power of definitely preventing the onset of paralysis when administered early in the disease. In ten undoubted instances of poliomyelitis in which no paralysis was detected at the time serum was administered, prevention of paralysis and complete recovery resulted in 100 per cent.

5. The action of the serum is more definite in arresting the extension of paralysis and diminishing the severity than in effecting its disappearance.

6. As in other acute infectious diseases, the earlier the serum is administered, the more striking are the results obtained.

7. Serum should be injected intraspinally in small doses and at the same time intravenously in larger amounts. The temperature has been employed as a guide to the dosage.

8. The injection of serum is followed by a critical fall in the patient's temperature. Coincident with this there occurs a slowing of the pulse-rate, and usually other definite clinical evidence of general improvement.

9. In doubtful early cases the decision to use serum should rest on the bacteriologic, chemical and microscopic examination of the cerebrospinal fluid.

The Bacteriology of Poliomyelitis. It is demonstrated to the satisfaction of Horace Greeley[7] that the organism isolated from the nerve centers of poliomyelitis (including the "streptococcus" described by various observers) is a pleomorphic bacillus of the distemper group which varies in characteristics much as the various supposedly different members of the group do from one another; that this poliomyelitis bacillus could cause paralysis in rabbits, cats, dogs and guinea pigs, and that an accidental passage of the culture through man gave rise to abortive symptoms of the malady; that after this last-named passage it could produce paralysis in the rabbit and a contagious infection of guinea-pigs with nerve center lesions and, finally,

(7) Jour. Lab. and Clin. Med., July, 1917, p. 671.

that from the guinea-pigs it could produce distemper in cats.

In a contribution to the bacteriology of acute anterior poliomyelitis John A. Kolmer, Claude P. Brown and Anna M. Freese[8] report that intracranial, intravenous, and intraperitoneal injection of easily cultivated streptococci, diplococci, diphtheroids, and Gram-negative bacilli failed to produce paralysis in rabbits or monkeys. With two exceptions, all the cultures were transplants from the original anaërobic ascites-broth-kidney cultures of cerebrospinal fluid and various tissues. Arthritis and meningitis were produced by the streptococci, but there were neither clinical nor histologic evidences of true poliomyelitis.

As regards these easily cultivable microörganisms, they agree at present with those who regard them as secondary and probably terminal invaders rather than the actual etiologic agent of the disease.

Cultivation and Immunologic Reactions of the Globoid Bodies in Poliomyelitis. Two additional cultures of globoid bodies, obtained from the nervous tissues of monkeys in which experimental poliomyelitis was produced, and identical with the original cultures described by Flexner and Noguchi, are reported by Harold L. Amoss.[9]

The highly parasitic cultures, like *Treponema pallidum,* are refractory to artificial cultivation and present many analogies in cultural, immunologic and pathogenic properties to it.

After long cultivation outside the body, the globoid bodies acquire saprophytic properties and then grow more readily and in a considerable variety of media, provided, however, that they carry a certain quantity of protein matter not denatured.

Neutralization of the Virus of Poliomyelitis by Nasal Washings. The results of fifty-six experiments performed by Harold L. Amoss and Edward Taylor[1] have shown that washings of the nasal and pharyngeal muco-

(8) Jour. Exp. Med., June 1, 1917, p. 789.
(9) Jour. Exp. Med., April 1, 1917, p. 545.
(1) Jour. Exp. Med., April 1, 1917, p. 507.

sas possess definite power to inactive or neutralize the active virus of poliomyelitis.

This power is not absolutely fixed, but is subject to fluctuation in a given person. Apparently inflammatory conditions of the upper air passages tend to remove or diminish the power of neutralization. But irregularities have been noted, even in the absence of these conditions.

It is suggested that the production of healthy carriers through contamination with the virus of poliomyelitis may be determined by the presence or absence of this inactivating or neutralizing property in the secretions. Whether this effect operates to prevent actual invasion of the virus and production of infection can only be conjectured. Probably the property is merely accessory and not the essential element on which defense against infection rests. It is more probable that other factors exist which help to determine the issue of the delicate adjustment between contamination and infection.

The Hematogenous Invasion of the Cerebrospinal Axis in Poliomyelitis. LaSalle Archambault[2] formulates, in a more or less provisional fashion, the following conclusions:

1. The virus of poliomyelitis is carried into the central nervous system through the blood-stream and particularly by way of the vertebral artery and its distribution.

2. The virus exerts its deleterious action upon the nervous tissue in part as the result of local toxemia and in part as the result of vascular disturbances due to direct irritation of the sympathetic apparatus.

3. Poliomyelitis is an acute infectious and communicable disease of the entire organism, but with elective localizations in the central nervous organs. Transmission probably does not occur by direct contact, but largely through intermediate agency of insects having both indoor and outdoor activities.

4. The incubation period of the disease in man is

(2) Albany Med. Ann., January, 1917.

not positively known and probably shows considerable variations under different conditions.

5. Poliomyelitis should probably be classed among the diseases common to man and animals.

6. Until more scientific certainties are available, all children of susceptible age in a given community should be absolutely protected from insects the moment that poliomyelitis appears in epidemic form.

Complement-Fixation in Acute Anterior Poliomyelitis. Complement-fixation tests conducted with the cerebrospinal fluid of 130 patients suffering from acute anterior poliomyelitis and salt soluble extracts of various tissues, by J. A. Kolmer and Anna E. Freese,[3] yielded from 16 to 60 per cent. of weakly positive reactions with extracts of spinal cord, pons and medulla, cerebellum and cerebrum, and from 15 to 17 per cent. positive reactions with extracts of poliomyelitic liver and spleen. These and other results indicate that the micrococci of poliomyelitis may produce antibodies during the course of the disease in a manner analogous to to the production of antibodies by streptococci in scarlet fever. Suitable salt-soluble extracts of various tissues from fatal cases of poliomyelitis may serve in a small percentage of cases to fix or absorb a small amount of cerebrospinal fluid, but the reactions are too irregular and weak to be of any practical value in the diagnosis of the disease.

Diseases of the Sympathetic and Spinal Ganglia.

Histopathology of the Autonomic Nervous System in Certain Somatic and Organic Nervous Diseases. It was thought, by Mary Elizabeth Morse,[4] that an examination of a few representative parts of the system in a series of autopsies would be valuable, particularly in connection with conditions found in the central nervous system and ductless glands. Accordingly, during the past year a routine study of selected portions of the system has been made in certain suitable autopsies

(3) Jour. Immunol., Nov. 2, 1917, p. 327.
(4) Jour. Nerv. and Ment. Dis., January, 1917, p. 1.

(those done within a few hours after death) at the Boston State Hospital. They have shown that lesions in considerable variety are present in the autonomic ganglia in a variety of disease, both of the viscera and the nervous system. Changes in the ganglia are in the majority of the cases of the same general character as those in the central nervous system, as for instance the chronic degenerative processes, chromatolysis and axonal reaction of pellagra, and the pigment atrophy and disintegration of senile dementia. In several instances, however, the lesions in the ganglia did not coincide with those of the central nervous system, but seemed to bear a relation to somatic conditions, *e. g.*, axonal reaction in the thoracic ganglia, lobar pneumonia, chronic degenerative changes in semilumar ganglia, duodenal ulcer; chromatolysis limited to stellate ganglia, mitral and tricuspid insufficiency; chromatolysis, neurophagia and inflammatory edema, generalized tuberculosis; pigment atrophy, pigmented phagocytes and lymphocytic infiltration in a ganglia near a subpleural carcinomatous metastasis.

The cases in this series may be grouped as follows:

(*a*) Those showing universal incidence of lesions in the autonomic ganglia. This includes the cases showing diffuse organic disease of the central nervous system—pellagra, pernicious anemia, arteriosclerosis, paresis, senile dementia and katatonic hirntod; also the case of involutional depression, and of disseminated visceral disease, tuberculosis.

(*b*) Those showing a localized distribution of lesions, standing in apparent relation to visceral conditions. This includes examples in the vertebral, prevertebral and peripheral ganglia.

(*c*) Those showing notable exudation. This group overlaps the other two, and includes cases showing plasma and endothelial cells, a noteworthy number of lymphocytes and mast cells, or serous exudate.

In an agitated depression changes suggestive of fatigue processes were found in the thoracicolumbar chain of ganglia, and in a case of katatonic hirntod

marked lesions of an acute degenerative type, associated with neurophagia.

A Further Study of the Histopathology of the Autonomic Nervous System in Goiter. Continuing his previous work, Louis B. Wilson in conjunction with Thomas O. Young[5] concludes that the changes occurring in the cervical ganglion cells in exophthalmic goiter show every resemblance to the changes in the ganglion cells in the spinal cord in anterior poliomyelitis, and to the changes in the cortical cells in the cerebrum in meningitis. They think that this may best be explained on the hypothesis of a specific primary infection of the ganglion itself.

The Relation Between Overactivity of the Vagus System and Anaphylaxis. The vagatonic condition described by Eppinger and Hess is the symptom-complex seen in a certain class of so-called "neurotic" individuals, according to Joseph H. Smith.[6]

It is of advantage to recognize the type, whether or not an underlying cause can be determined in the individual. A better understanding is attained by recognition of the type of neurosis, as rational symptomatic treatment can be applied.

Anaphylaxis manifests itself chiefly through vague irritation. Certain products of the proteolytic process have the pharmacologic properties of vagus irritants. In this respect, these toxins, pharmacologically, belong to the class of pilocarpine. An exaggerated reaction to pilocarpine is displayed by vagotonic individuals. The clinical parallel seen in serum sickness develops in some, but not in all, vagotonic individuals. Such individuals must be assumed to be specifically sensitized to the serum.

The question arises: how far may toxic influences, especially anaphylatoxins, be considered as underlying the vagotonic state?

Definite proof exists of the anaphylactic nature of certain cases presenting vagotonic manifestations, *viz:*

(5) Jour. Lab. and Clin. Med., February, 1917, p. 295.
(6) Jour. Nerv. and Ment. Dis., January, 1917, p. 26.

parasitic infestations, food idiosyncrasies, asthma and hay fever.

Spastic constipation and the resulting mucous colitis are essentially vagotonic. Eosinophilia usually appears in association with the evidences of vagus irritation. The interpretation of urticaria is practically the same as of eosinophilia. Mechanical and reflex influences are capable of causing vagal stimulation. But such factors manifest themselves chiefly through their action on the heart and in a type of dyspnea different from the asthmatic. The influence of temperament and the emotions can not be denied, but practical considerations suggest the search for a toxic basis in all cases.

In the interpretation of vagotonic symptoms without apparent cause, two toxic factors are among the possibilities—ductless gland disturbances and chronic bacterial infection. In these groups the most important are thyroid intoxication and tuberculosis. Atropine is a valuable symptomatic remedy in most of the conditions discussed. Adrenalin usually gives better results in urticaria, and sometimes in bronchial asthma.

Tumors of the Thymus in Myasthenia Gravis. A benign thymic tumor from a typical case of myasthenia gravis is described by E. T. Bell.[7] He says that thymic lesions can not be regarded as the cause of myasthenia, since they are present in only about half the cases. Probably the abnormal thymus is due to some more fundamental disorder which is also responsible for the muscle weakness and other features of the disease. The hyperplastic thymus of Graves' disease is usually interpreted in this way.

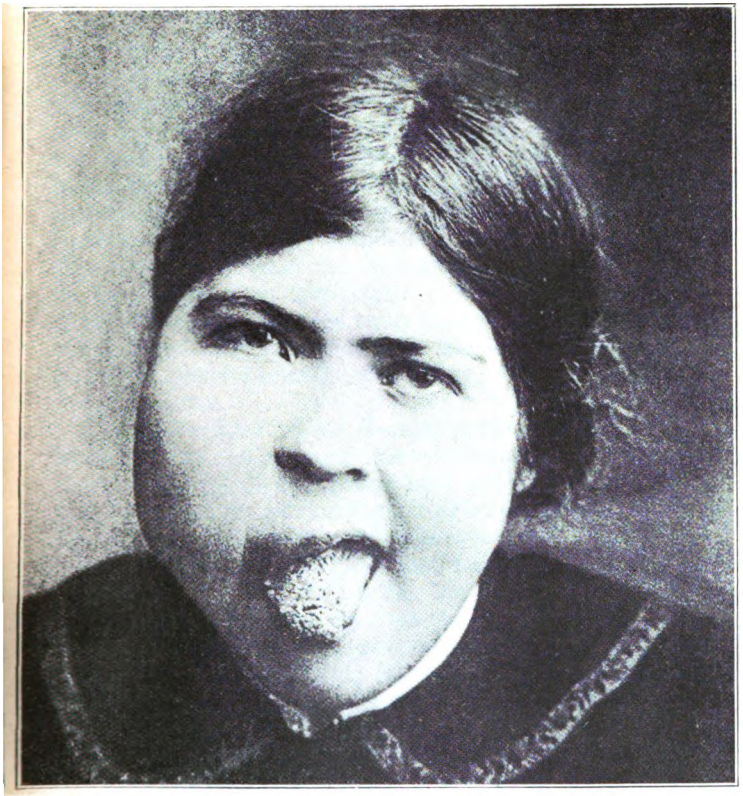
The tumor in the case reported was composed of thymic tissue of a fetal type, *i. e.*, a dense epithelial reticulum with lymphocytes. The usual thymic rests were found in the adipose tissue around the growth.

The thymic tumors occurring in myasthenia gravis seem to form a distinct group unlike any other thymic tumors. They may be classified as benign thymoma.

Some abnormality of the thymus is found in nearly half the cases of myasthenia gravis.

(7) Jour. Nerv. and Ment. Dis., February, 1917.

PLATE XIV.



Cranio-facial-lingual hemihypertrophy with facial trophedema—Pabhon and Verin, page 161.

Virilism: Forme-Fruste. The starting point of the inquiry by Henry K. Marks[8] developed from a consideration of those rare and extraordinary cases of hyperplasia or neoplasia of the suprarenal cortex in which the cardinal syndrome was the development of heterosexual characteristics in the female. The question proposed itself, granted this group of cases, may not attenuated or incomplete forms of syndrome exist?

He draws a series of clinical pictures in the female, the central point of which is a striving toward maleness with a corresponding loss of female characteristics. On the basis of twenty-two observations, the proposition is made that a type of virilism exists which corresponds essentially to the clinical picture if the *virilisme surrenale* of Gallais, but which is attenuated and compatible with life. That the intrarenal tissue plays a rôle, probably the most important rôle, in the development of the syndrome is more than likely. Among the symptoms noted may be mentioned hirsutism of male type, sterility, psycho-sexual infantilism, femina frigida, infantile uterus.

Cranio-Facial-Lingual Hemihypertrophy, with Facial Trophedema. A case of this condition came under the observation of C. J. Pabhon and Mlle. A. Séverin.[9] A girl of 18 sought advice for exaggerated development of right cheek and corresponding one-half of tongue, of congenital origin. The marked facial asymmetery was striking. The distance from the right alanasi to the lobule of ear was 14 cm., on the left only 11. Moreover, the skin on this side was more highly colored. The transition was clearly marked at the philtrum where the more pronounced relief of the right side was noticeable. The same condition was to be seen, though less evident, about the chin. There was no difference in the surface temperature. The right cheek (compass) was 5 cm. thick, the left only 2 cm. The nose deviated slightly to the left, and the right nostril was larger. The bones as well were more developed, especially the malar, zygomatic process and both maxillæ. The down

(8) Jour. Nerv. and Ment. Dis., Vol. 46, No. 1, p. 17.
(9) Nouv. Iconog. de la Salpetrière, 1916-7, No. 4.

on the upper lip was more apparent on the right, and on the cheek gave a rough feeling, while the opposite side was smooth and clear. As remarked, the color over the right cheek was deeper than on the left side, though the finger left no imprint. The right half of the tongue was considerably hypertrophied and the papillae were from 1 to 2 mm. high, while those on the left, as normally, were scarcely visible. The right half of the palate was thicker than the other side. On the mucosa of the cheek were some papillae from the size of a lentil to that of a grain of corn. The teeth on the right, starting with the canine, were somewhat larger, and far apart; those on the left side were touching. The hypertrophy of the lingual mucosa was to be seen on the lower surface also, the raphé was not in the midline. The right half measured 3 cm., the left only 1.6 cm. When the orbiculares palpebrarum were strongly contracted, the wrinkles were more marked on the left side. There was no paralysis of any of the facial muscles. Speech was but little altered. A fragment excised from the tongue near the tip was examined microscopically, and showed proliferation of the derma and its papillae.

The symptomatology of this case is too precise and too complete for it to be confused with other affections, *e. g.*, elephantiasis, edema from compression, or a simple lipoma. Moreover, the hypertrophy of the tongue can not be confounded with a tumor, lingual syphilis, etc. We have, then, to deal with the trophic trouble known as "congenital facial hemihypertrophy," about which Sabrazès and Cabannes, who observed a somewhat similar case, published an interesting study in 1898.

On the other hand, the fatty infiltration of the cheek with no trace of inflammation, without true edema, the skin showing no pitting on pressure, represents the same trouble, according to the authors, as the trophedema of Meige, rarely localized in the face, to be sure, though an example is reported by Hertoghe. The involvement of the skeleton does not negative the diagnosis, for it has been seen in other cases also.

Certainly the involvement of the tongue makes of this case, as of similar ones, a more complex condition than

the usual trophedema. Notwithstanding, the authors believe the lingual affection, that of the face, etc., are identical as to origin; their variable aspect is due solely to their localization in different tissues (Plate XIV).

The authors insist the cases show the influence of the soil in the development of different tissues; thus, in the cases of Friedreich and of Heumann, the teeth were more developed on the hypertrophied side. Though less marked, this was present apparently in the author's case. Of all cases on record, the right side was involved eleven times and the left nine times.

Diseases of the Peripheral Nerves.

Regeneration in Peripheral Nerves. An Experimental Study. In a previous communication, Edwin G. Kirk and Dean D. Lewis showed that nerve defects may be bridged successfully by tubulizing with an autotransplant of fascia. Recently they[10] report that a histologic study showed an exudate of serum into the empty fascial tube beginning on the first day. At the end of seventy-two hours, the tube is partially filled with serum containing a few mononuclear migratory cells. If hemostasis has been adequate, there will be practically no erythrocytes. By the fifth day, the portions of the tube nearest the two nerve stumps are filled with a soft grayish-white pulpy material, resembling in appearance soft brain matter. The exudate comes from the nerve ends, the fascia showing no reaction. Microscopically, this pulpy material is finely granular and homogeneous—evidently coagulated lymph.

They conclude:

1. In the immediate vicinity of nerve trauma associated with break of continuity there occurs an accelerated hyperplasia of the neurilemmal elements which results in the early formation of protoplasmic bands. These develop in both proximal and distal stump and tend to bridge the defect. Along these protoplasmic pathways the regenerating axis-cylinders from the central stump pass. Whether they reach the distal stump

(10) Bull. Johns Hopkins Hosp., February, 1917, p. 71.

and neurotise depends largely on the extent to which these preformed conduits have successfully prepared the way.

2. All efficient regeneration of nerve fibers (axis-cylinders) is from the central stump. All regenerating nerve fibers, whether the outgrowth of medullated or of non-medullated axones, are in their early stages non-medullated.

3. All medullation begins proximally and proceeds distally, appearing only in those parts of the new axis-cylinder which have acquired an age of 5 or 5 1/2 weeks (in the dog).

Degeneration of Muscle Following Nerve Injury. With the idea of reviewing the present state of our knowledge of injuries to peripheral nerves, and to put on record fresh observations and to explain the phenomena F. Roberts[1] presents an article with the following conclusions:

1. The normal muscle responds to the faradic current, whereas the degenerated muscle does not. To the galvanic current the normal response is brisk, the pathologic is slow, or vermicular.

2. When the process of degeneration has lasted a month the degenerated muscle is less excitable than normal to the constant current.

3. In normal muscle K. C. C. is greater than A. C. C. so long as the test electrode is placed on the motor point. In the degenerated state the muscle tends to be indifferent to polarity; difference may exist in their contraction, but these are small in comparison. In normal muscle the K. C. C.: A. C. C. increases with the increase of stimulants; in degeneration the relationship is not varied by increase of stimulants.

4. Normal muscle is more excitable at its motor point than at any other part. Degenerated muscle is equally excitable at all points on its surface.

5. In cases of peripheral nerve injury there is usually no doubt as to whether the muscle is degenerated or not. The question of practical importance is the extent of the injury which the nerve has suffered, and electric

(1) Brain, October, 1916, p. 297.

reactions give but a limited answer to this question.

6. Constant current interrupted by a metronome is the best form in which to administer treatment.

Roberts believes that Langley's conclusion that daily stimulation is useless is inconclusive and altogether beside the point. He advises daily treatment of from fifteen to twenty minutes, care being taken that the current does not spread so as to stimulate the healthy muscles of the opposite side of the limb.

Gunshot Wounds of Peripheral Nerves. Based upon the study of seventy-five cases of nerve injuries Byron Stookey[2] offers the following conclusions:

1. With the use of high explosives and the bullets with high velocity the frequency of nerve lesions has increased.

2. Peripheral nerves may be injured by direct violence of projectiles and by the violence imparted to bits of bone or even foreign bodies.

3. Peripheral nerves may be implicated secondarily by scar tissue or callus, or both.

4. Diagnosis can not be made before operation between anatomic and physiologic division. Diagnosis can usually be made in cases with incomplete division.

5. In war injuries, primary suture is rarely possible, because of infection.

6. Exploratory operation is indicated when a diagnosis of complete division is made. Delay in operating usually means a delay in return of function.

7. Nerve freeing is in many cases to be preferred to excision and suture. When the nerve is widely implicated and there is a loss of continuity it is better to do nerve transference or nerve transplantation than tubulization or suture with the nerve under tension.

8. Stretching of the nerve should not be done, as it causes karyolysis of the nerve cells and the ventral horn, with subsequent degeneration of the nerve axone in the proximal nerve trunk.

9. Efficient splinting to prevent contractures and over-stretching of muscles is imperative, both before and after operation.

(2) Surg., Gynec. and Obstet., December, 1916, p. 639.

10. The terms "epicritic" and "protopathic" tend to be confusing. Greater accuracy in the use of specific terms as "area of cotton wool," "area of pin prick," "areas of moderate and extreme degrees."

11. Musculospiral nerve injury in its lower third does show loss of sensation on narrow point over dorsum of thumb, usually only lost to cotton wool and temperature sense.

12. Injury to musculospiral nerve may cause dissociation of temperature sense in the area on dorsum of hand without loss to cotton wool.

13. The median nerve does not supply any skin on the dorsum of the thumb; it supplies up to a line in continuation of lateral borders of nail.

14. The anterocutaneous division of the ulnar nerve supplies the skin in the same manner as does the median nerve; *i. e.*, on the dorsum of fifth and part of fourth, middle and distal phalanges. The posterocutaneous division supplies the ulnar side of the hand and the proximal phalanges of the fifth and part of the fourth. The action of extensor assists the interossei in separating the fingers. To test for paralysis of the interossei have the patient open his fingers at right angles at the metacarpal phalangeal joints. Prevent effort of extensors by holding the fingers across, then have the patient try to separate the fingers gently.

16. Return of motor function begins with the muscles which first receive their supply below the lesion. It returns earlier the nearer the lesion is to the periphery.

17. Trophic ulcerations occur only after trauma. Their repair appears to be no different from that in other parts.

18. Functional disorders may be superimposed on organic peripheral nerve lesions.

War Injuries to the Musculospiral Nerve. Of the nerves of the upper limb the musculospiral nerve is the most commonly injured, usually by gunshot or shrapnel wounds, while often the humerus is simultaneously fractured.

W. B. Warrington and Philip Nelson[8] state that the

(8) Liverpool Medico-Chirurg. Jour., 1916, p. 51.

first point in such cases is to determine the site and extent of the lesion. Next it is necessary to know if the nerve has been completely divided or has entirely ceased its function. The authors refer to the theory that this nerve, as well as others, has an internal anatomy or geography.

Shortly after the musculospiral nerve arises from the posterior cord it divides into two distinct and easily separable groups of fibers. One group, consisting of about a third of the total bulk of the nerve, includes the fibers for the three heads of the triceps and anconeus; and in a transverse section of the nerve, if the arm be considered as resting upon a flat surface with the forearm supinated, this group of fibers can be traced up into the parent trunk and always occupies the ulnar or inner side of the section.

The larger group passes downward, turning backward into the musculospiral groove, and at this site the fibers for the extensor muscles of wrist and fingers are situated dorsally and externally, while the ramus superficialis (radial nerve) is situated anteriorly and internally.

The explanation of the varying effects of division of the musculospiral nerve on the sensation of the hand would appear to be found in the extensive anastomoses which the radial forms with cutaneous branches of the musculocutaneous and the varying distribution of the dorsal cutaneous branches from the upper part of the musculospiral; sometimes, indeed, this nerve descends on to the back of the hand.

They state that if there is complete loss of function:

1. For three months the hand and the fingers should be supported on a light splint, the muscles being daily massaged and passive movements of the joints carried out. The muscles should also be stimulated by the galvanic current.

2. If recovery in any muscles, even though very slight, can then be discerned, this treatment should be continued and, further, the patient encouraged to attempt voluntary movement.

3. If, on the other hand, there is no recovery, the nerve should be explored.

4. After operation, postural fixation, massage, and passive movement are still urgently required.

5. If at the end of from six to eight months from the date of operation on the nerve not even the slightest voluntary movement is discernible, then we think the propriety of tendon transplantation should receive careful consideration.

6. If when the nerve is first examined eight months or more have elapsed since the date of injury, and complete loss of function is found, then the prognosis as regards recovery is doubtful.

Operative Treatment of Injury of the Peripheral Nerves. All wounds caused by present-day projectiles, even those produced by rifle and machine-gun bullets that enter and emerge through tiny skin punctures, are regarded as infected by J. Renfrew White.[4] Therefore, any operation on an injured nerve which is carried out through already infected tissues will only spread such mischievous processes up and down. There should be observed some definite relation between the "period of probation" of the healed wound considered desirable and decided on in each case: (1) The depth and extent of the original wound; (2) the nature of the projectile that caused it; (3) the amount and character of the suppuration that ensued; (4) the length of the period of healing; (5) the presence in the tissues of further foreign bodies during this period; (6) the presence or absence originally of bone injury, necrosis, or caries.

Operation is indicated:

(*a*) Where a previously recognized incomplete lesion has become clinically complete in the course of time;

(*b*) Where the clinical picture of "completeness" is associated with a palpable spindle, for example, in the case of the ulnar nerve behind the internal humeral condyle and where one can feel subcutaneously continuity between the spindle and the nerve trunk above and below;

(*c*) Where from the history of previous shooting pains

(4) Brit. Med. Jour., March 24, 1917, p. 381.

or paresthesias which now have ceased—signs of incomplete division—one can deduce that the lesion has not been complete from the beginning;

(*d*) Where the track of the projectile is near, but obviously does not cross the path of the nerve—the diagnosis of a physiologically complete division is possible.

If it be unknown whether the lesion be anatomic or physiologic, if there has been no sign of its becoming incomplete up to the end of the period of healing of the wound and of a further reasonable period of probation of the healed wound, operation should not be delayed, for one can not be certain that the lesion is not anatomic and, if it be physiologic, the lesion must be one in which spontaneous regression to recovery is unlikely.

If it be known that the lesion is physiologic—that is, in all cases falling into groups (*a*), (*b*), (*c*), (*d*)—again operation should not be delayed beyond the periods of healing and probation, if during those periods the signs have not regressed to clinical incompleteness; for in these cases what pathologic conditions are conceivable that will, in their evil effects on regeneration and conductivity, be anything but stationary or progressive?

Operative interference may be necessary and indicated in cases of incomplete division for one or more of the following causes:

1. Where an incomplete lesion remains stationary after the wound has healed soundly and the disability remaining is serious or severe.

2. Where an incomplete lesion is increasing in the severity of its clinical signs and the disability is serious from the beginning or becoming so.

3. Where after a nerve has recovered up to a certain point some serious disability remains.

4. Because of persistent pain—for example, in causalgia—to give the patient relief; or for persistent hyperaesthesia or hyperalgesia which is severe and troublesome.

Radiotherapy for Wounds of Nerves. Bordier and Gerard[5] report twenty-five cases of war injury of nerves treated satisfactorily by the Roentgen rays. When the exposures are given early the response to electric stimulation returns to normal. Surgical intervention is advised when the reaction of degeneration is complete; then radiotherapy applied at once may restore normal conditions. They hope that this treatment may make it possible to ward off paralysis and other infirmities consequent to severe injury of nerves. To accomplish this, however, the men having one or more lesions which fail to respond to electric stimulation must be kept in the hospital long enough for the different measures used to realize their complete effect.

Experiments on Motor Nerve Regeneration. During the past three years Charles A. Elsberg[6] has performed a series of experiments on the nerves and muscles of rabbits' thighs in order to study the action of the physiologic regeneration of motor nerves when directly implanted in the paralyzed muscles, and the possibility of re-establishment of normal neuromotor connections. In all his experiments, electrical stimulation of the implanted or re-implanted nerve was followed in eight or ten weeks by good contraction of the muscles. When a foreign motor nerve was implanted into a muscle whose normal motor supply was intact, it was found eight or ten weeks later that while electrical stimulation of the normal motor nerve gave good contraction, similar stimulation of the implanted nerve was without result. But if the muscle is permanently separated from its original nerves, then the implanted nerve will establish neuromuscular connections and electrical stimulation of the nerve will soon cause normal contractions of the muscle.

Peripheral Neuritis Following Emetine Treatment of Amebic Dysentery. From a study of seven cases A. R. Kilgore[7] concludes that peripheral neuritis after emetine treatment is not uncommon, the symptoms often develop-

(5) Presse méd., Aug. 6, 1917, p. 453.
(6) Science, March, 30, 1917, p. 318.
(7) Boston Med. and Surg. Jour., Vol. 175, 1916, p. 380.

ing after the emetine injections have stopped. The amount of emetine necessary to produce neuritis varies greatly. The prognosis is good. The symptoms clear up in several weeks and leave no trace. Finally, experiments show that peripheral neuritis may be produced in dogs by emetine.

Thermalgia (Causalgia). From the study of a large number of cases it is clear to John S. B. Stopford[8] that thermalgia, as generally described, is only an extreme type of many median and sciatic injuries, and to determine the etiology it is necessary to investigate all cases in which pain is the predominant and constant symptom.

One frequently sees median, sciatic, or posterior tibial nerve injuries in which there has been a complete recovery from the paralytic and objective sensory symptoms, but where there is marked disability from manifestations, which suggest the same etiology as the foregoing cases. It is quite common to find tenderness to even slight pressure of the inner or outer borders of the foot as a residual symptom, which is persistent and sufficient to incapacitate the man from getting about, although the muscles may have regained their normal vigor. This tenderness is often associated with slight "glossy skin" or simple hyperemia, and the patient usually complains of a throbbing pain in the foot which is made worse by warmth or dependency of the limb. These cases are very apt to be neglected or dismissed as hysterical, yet a careful examination will show they are really milder forms of thermalgia.

It is not uncommon to obtain a history of pain, which suggests thermalgia, lasting for a period of a few days or even weeks and then passing off, usually with the development of more profound motor and sensory symptoms. These are cases in which the excessive fibrosis has gradually strangled the undivided fibers and produced eventually the clinical picture of complete division.

The clinical symptom which is constant and characteristic in all these cases is the "bursting," "throbbing," or "burning" pain in the hand or foot. The affected part is generally swollen or doughy and the

(8) Lancet, Aug. 11, 1917, p. 195.

temperature of the skin higher than on the normal side. Often the appearance of the hand or foot suggests the presence of deep suppuration in the palm or sole. The pain is usually persistent, intractable, and in its severest form sufficient to render the patient emotional or even to drive him to suicidal tendencies. It is made worse by heat, movement, excitement, or the dependent position, and as a result any treatment for the paralyzed muscles is impossible so long as the pain persists. The only thing which appears to render the least relief is cold, and this fails if there is a marked loss of sensibility.

The associated symptoms are by no means constant and dependent considerably upon the number of fibers divided. In most cases they are characterized by manifestations of nerve irritation as glossy skin, hyperidrosis, hyperemia, and bone and joint changes. As a result of the arthritic changes and the inability to treat the paralyzed muscles most distressing and unsightly deformities occur in the later stages of neglected cases.

From the appearance at operations and microscopic examinations of excised portions of nerve it is evident that two constant conditions are found in thermalgia—first, partial division, and secondly, intraneural fibrosis.

It is extremely unlikely that the pain can be simply the result of irritation of fibers subserving common sensibility, because the pain is not of a neuralgic type and quite different from that due to irritation of a purely sensory nerve.

At least three possibilities suggest themselves:

1. Paralysis of vasoconstrictor fibers.
2. Direct irritation of vasodilator fibers.
3. Reflex vasodilatation.

Only operative measures can achieve treatment satisfactorily. The indications for early operation are the agonizing pain—which wears the patient mentally and physically and may persist for months, and so prevent the paralyzed muscles being treated—and the permanent disabilities, motor, sensory, and vascular, which are frequently the result of the progressive fibrosis.

The essential factors in successful operative treatment appear to be:

First, careful separation of all adhesions around the nerve and absolute clearing of all perineural fibrosis.

Secondly, complete hemostasis to reduce the resultant scar as much as possible

Thirdly, protection of the nerve at the site of injury to prevent recurrent adhesions.

Fat seems to serve this purpose best, since it minimizes the risk of the formation of a thick fibrous sheath around the nerve, which so commonly follows the use of other tissues or extraneous material. Failing to procure fat, it is best to suture the injured muscles so that no raw surfaces are exposed and only undamaged portions are in contact with the nerve.

During the period of waiting for operation, on account of the risk of sepsis, the terrible pain is a very difficult symptom to treat. Considerable relief can generally be afforded temporarily by maintaining the limb elevated on pillows, with the hand or foot lightly wrapped in lint, which is kept moist with some evaporating lotion. Further benefit is obtained by keeping the patient free from disturbance, and, where practicable, in isolation.

Peripheral Sympathectomy. Leriche[9] reports the treatment of thirty-seven cases of rebellious contracture or causalgia by denudation and excision of the periarterial network of sympathetic fibers. Since his first report on this subject others have used this form of treatment. In the later series, the pain was permanently relieved in some, but not in all. A complete cure was effected in five cases of trophic ulceration. In sixteen of the thirty-seven cases the result was a success, and when massage and training of the muscles were associated with the peripheral sympathectomy good results were obtained in several of the others. Peripheral sympathectomy is an interesting and helpful operation in severe forms of what are known as reflex nervous disturbances (pain, paralysis and contracture), but the exact indications for its use are, as yet, undecided.

(9) Presse méd., Sept. 10, 1917, p. 513.

An Analysis of Fifty Cases of Sciatica. Of a series of cases of so-called sciatica reported by M. H. Rogers,[1] forty-nine showed definite evidence of a lesion of one of the joints of the lower spine, which include the lumbar articulations, the lumbosacral joint and the sacroiliac joints. Also there is definite evidence that the lesion of the spine has a direct connection with the pain in the sciatic nerve, as is shown by an increase in the pain when there is an attempt at motion of the joint involved. One case out of the fifty showed no evidence of a spinal lesion, but presented the characteristic evidence of carcinoma of the prostate. This case is included and helps to emphasize the point that there is always a definite cause at the origin of the nerve and not a perineuritis along the course of the nerve.

There are seventeen of the fifty cases which Rogers has classified as acute strain of the lower spine. Most of these represent an acute lesion in one of the sacroiliac joints, the sciatic symptoms sometimes coming on acutely secondarily to a chronic or recurrent strain of this joint.

Twenty-one cases out of the fifty are classified as chronic strain of the lower portion of the spine. It is more difficult in this group to connect the sciatic pain with the spinal condition, because the history is often misleading and sometimes shows no direct connection. But in every one of these cases there was definite evidence of a joint lesion, as shown by loss of motion and pain on motion, and it was possible to demonstrate an increase of sciatic pain when the affected joint was moved. It is in this group that we see the so-called sciatic scoliosis, which is perfect evidence of a joint lesion.

The third group is classified as hypertrophic arthritis, the diagnosis being based on the fact that the Roentgen-ray shows definite overgrowth of bone in the region of the lower lumbar spine, which corresponds to the facts as shown on physical examination. In this group there were eight cases out of fifty.

(1) Jour. Amer. Med. Ass'n., Feb. 10, 1917, p. 425.

The last group, four out of fifty cases, were proved cases of tuberculosis of the lower spine in adults.

The conclusions from this study are two:

First, there is no clinical entity which is commonly called idiopathic sciatica. The evidence is very strong that the accepted theory of a perineuritis due to some inflammatory condition of the nerve sheath if not proved, and that there is always a definite cause at the origin of the nerve. The most common cause of sciatic pain is a definite joint lesion.

Secondly, if we have to use the term sciatica, and we undoubtedly will, then it should be a part of the orthopedic teaching.

Cases of Post-Seric Tetanus. From a study of fifty-four cases of tetanus developing in spite of antitetanus serum injections, Auguste Lumière[2] draws the following conclusions:

1. Preventive injections of antitetanus serum have not an absolute and unlimited prophylactic action.

2. The duration of the absolute immunity conferred by the serum can not be fixed; it depends on the relative proportions of the toxin and the preventive serum which are contained in the system.

3. Cases of post-seric tetanus appear to be due to the following two principal causes: (*a*) Excessive secretion of the toxins in the wounds, out of proportion with the dose of serum injected (early post-seric tetanus). (*b*) Liberation of the spores of tetanus which are in latent activity in the tissue by means of surgical operation or trauma, when the activity of the antitoxin is exhausted.

4. Early post-seric tetanus can in most cases be prevented by laying bare of infected wounds and careful removal of any foreign bodies they may contain, and by free drainage and repetition of injections of serum once or oftener.

5. Preventive serotherapy sometimes imparts peculiar characters to post-seric tetanus, in that it alters

(2) Abstracted from Ann. de l'Instit. Pasteur, Jan. 31, 1917, in Rev. Neurol. and Psychiat., July, 1917, p. 259.

more or less the symptomatology and clinical course of the disease.

6. In some cases of post-seric tetanus (fifteen out of fifty-four) injections of antitoxin have prevented fixation of the poison in the central nervous system, its action being confined to the motor nerves of the wounded limb. These cases of localized tetanus without trismus are much less grave than the other forms.

8. In other cases (thirteen out of fifty-four) there is only partial protection of the bulbo-spinal centers. There is a late or partial trismus with a local contracture: the prognosis is then less favorable.

9. The prognosis is worst in those cases (twenty-six out of fifty-four) in which antitoxin has failed to protect the central nervous system; *i. e.*, cases which show trismus from the outset. The treatment of post-seric tetanus consists in as early as possble use of large doses of serum. At present there is no absolute curative treatment: we must combat the symptoms. We can do little for the permanent contractures, but the paroxysmal spasms can be treated by stupefiants—chloral, morphine, injection of sulphate of magnesia or persulphate of soda; the last named appears to be the remedy of choice on account of its efficacy and feeble toxicity.

The Place of Curare in the Treatment of Tetanus. It is the present practice of John C. McArdle[3] to treat cases of tetanus by early injections with curarine in doses of from 1/200 to 1/40 of a grain, given hypodermically, on the slightest sign of local or general spasm. He has thus had many gratifying successes. Along with this treatment he uses early serum injection. He advises that the antitoxin should be injected into the nerve supplying the affected part so as to intercept the toxin on its way to the central nervous system. The rapidity of action of curare is shown in a seemingly desperate case in which within three minutes of a hypodermic injection of 1/12 of a grain the spasm ceased. In this case the dose had to be repeated every sixth hour for three days.

(3) Dublin Jour. Med. Science, April, 1917, p. 239.

Miscellaneous Spinal Lesions.

Carcinoma of the Spine. A Case of Cauda Equina Disease Following Thyroid Metastasis. From the study of a case and a review of the literature pertaining to metastatic disease of the spine, A. Skversky[4] draws the following conclusions:

Carcinoma of the spine is of more frequent occurence than we are led to believe and has received relatively little recognition when compared with Potts' disease and the various other forms of spondylitis.

Carcinoma of the spine as well as any other part of the oseous system is never primary but always metastatic. If clinically overlooked, careful post-mortem examination will always reveal the primary site of malignancy. In carcinoma of the thyroid the growth is generally so small as to be overlooked clinically and the metastasis assumes the foreground in the disease picture.

The symptomatology of carcinoma of the spine is varied and obscure and does not follow any anatomic sequence. Direct objective evidence of disease of the spine is generally absent. Spontaneous bone pains without local tenderness are usually the first manifestation. Most important, as well as most frequent, are sensory root symptoms which are of the most intense character.

In adults, persistent sciaticas not responding to the usual therapeutic measures, and particularly when bilateral, should always direct suspicion to disease of the lumbar spine. The so-called "paraplegic douloureuse" of Cruvielhiere and Charcot has been considered as pathognomonic of carcinoma of the spine.

In carcinoma of the spine the disease process generally remains latent for many years. Because of the variability and protracted course, a case of supposed rheumatism, lumbago, sciatica, neuritis or functional spine is often considered cured when a mild degree of trauma may serve to precipitate a rapid destruction of the vertebral bodies.

(4) Jour. Nerv. and Ment. Dis., Vol. 46, No. 1, p. 40.

Cord or cauda equina symptoms in this class of cases are generally of very abrupt onset and lead to a rapidly fatal issue.

Roentgenology has up to date afforded little substantial aid in the early diagnosis of carcinoma of the spine. This may be due to the fact that carcinoma of bone of osteoclastic in contradistinction of primary growths, as sarcoma, enchondroma, etc., which are osteoplastic and which the *x*-ray shows a definite shadow.

The degree of structural involvement of the contiguous nervous tissue is not always commensurate with the extent of clinical disease. The spinal cord is practically never a site of carcinomatous invasion. There may be extensive cord degeneration without reasonable post-mortem evidence of direct pressure of the spinal growth and *vice versa*, as in this case. The question of neurotoxemia must always be considered.

He calls attention to the fact that if early recognized the course may be alleviated and possibly controlled by Roentgenotherapy.

Progressive Muscular Dystrophy as an Endocrine Disease. The more recent investigators have severally and individually been approaching a position regarding progresssive muscular dystrophy whose supports are disturbances in the endocrine glands, and have begun to consider the actual muscular disturbances merely as incidents in a widespread affection. Walter Timme[5] says that when we consider the converse of the proposition, namely, that known endocrine glandular disturbances, especially those of the pineal gland, have produced in the muscular, bony, and vasomotor systems conditions very similar to those found in the muscular dystrophies (although not all at one time in any one patient), we must accept some casual relationship between the two.

He reports a patient with a somewhat atypical form of progressive muscular dystrophy, rather resembling Erb's infantile type, of extremely benign and slow progress. It occurs as a hereditary affection, now in

(5) Archiv. Int. Med., January, 1917, p. 79.

the fourth generation, which has disabled fourteen individuals. Of the seven living members with the disease, all but two have been examined thus far by Roentgen ray, and of these five, four show distinct changes in the pineal gland producing shadows in the roentgenogram. The fifth, a youth of 15 years, whose affliction is rather of different type than the others, in that the bony growth is abnormal, shows an enlarged sella turcica, but no shadows in the pineal as yet. Weighing all the evidence that is advanced by previous investigators to show derangement of the internal glandular balance in cases of progressive muscular dystrophy, and giving due significance especially to the changes produced by tumors and diseases of the pineal gland on the various tissues of the body, changes that resemble in character, if not entirely in degree or disposition those present in progressive muscular dystrophy, we must admit the extreme probability of a causal relationship between the two. If to this probability we actually adduce the evidence shown by cases of progressive muscular dystrophy of changes in the pineal gland demonstrated by roentgenology, the probability approaches pretty closely to proof that disturbances of the pineal gland play an important rôle in the pathogeny of progressive muscular dystrophy.

A Study of the Metabolism in a Case of Amyotonia Congenita. A case of amyotonia congenita of medium severity is described by F. Powis and H. S. Raper.[6] Since the case was associated with some nutritional disturbance the findings cannot be said to be entirely clear, yet the cases are by no means common and the authors feel justified in publishing this account. Their chief findings may be summarized as follows:

1. A diminution of hepatic functional activity as manifested by the presence of acholia. Whether this is an accidental association or is of importance in the pathology of the disease can only be determined by a study of other cases.

2. A normal calcium retention associated with a relatively high potassium retention.

(6) Quart. Jour. Medicine, January, 1917.

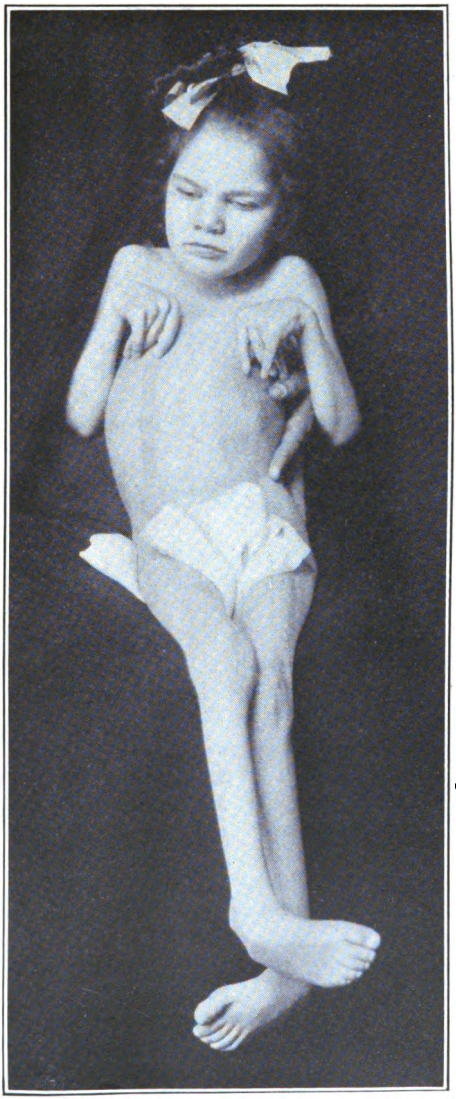
3. A low creatin excretion as established by previous observers, and accompanying this a relatively high creatin excretion. Until more is known about the formation of creatin, its rôle in the body and the reasons for its appearance normally in the urine of children, this high creatin excretion can not be explained.

4. Treatment with bile salts or dried ox bile produced some improvement, as manifested by an increase of strength in the muscles, and a change toward the normal in the ratio of the potassium to the calcium retention, the normal values, owing to a lack of other data, being deduced from the ash analysis of young animals.

Report of Three Cases of Familial Spastic Paralysis. A report of three cases of familial spastic paralysis is made by C. Eugene Riggs.[7] Family history negative, except that a male on father's side had epilepsy. Neither parent alcoholic nor luetic. Grandparents died past 60; one of tuberculosis. Mother's father alive and well. Mother's mother had ten children; all well. Father's mother had seven children. One brother has two children, all well; another brother had one child, well; another had one child, died at birth; another brother and sisters are single. Mother's aunts (three) died in infancy. One died at age of 15 of hemophilia.

First Child: E., female, aged 12 years; birth normal. Absolutely well until 3½ years old, when she developed whooping cough, which continued until onset of present trouble. April 25, 1906, she developed an acute illness of two weeks' duration, characterized by fever, intestinal disturbance and delirium, from which she made a slow convalescence. From this time, walking seemed a little awkward. In September, 1906, there was a decidedly spastic gait. Both arms became affected in January, 1907. August, 1907, speech became affected, because jaws seemed to be stiff. General condition grew worse for two years, then became stationary. In 1910, it was discovered that the child

(7) Jour. Nerv. and Ment. Dis., December, 1916, p. 505.



Case E. Familial spastic paralysis—Riggs, page 180.

was blind. She has not spoken a word since 1910 and can only give a whining cry. She can not chew food, because of rigidity of masseter muscles and has to take liquids. Some difficulty in starting flow of urine. For the past four years she has suffered from occasional epileptiform attacks, when the eyes turn to the left, and mouth draws to left, and the whole body stiffens out. Frequently, it is only a shivery spell. Has been drooling from the mouth for the past few years. At present, there is general atrophy of all the muscles of both lower extremities, neck muscles, jaw and both recti abdominal muscles and spinal muscles, with marked spasticity. Babinski on right side; questionable on left. Oppenheim and Gordon present on both sides. Deep reflexes increased; superficial reflexes normal; no sensory disturbances. Blood and urine normal. Wassermann in blood negative. Spinal fluid pressure normal; no globulin; four lymphocytes; Wassermann negative; colloidal gold curve normal (Plate XV).

Second Child: H., male, 9 years old and well.

Third Child: I., male, 7 years old and well.

Fourth Child: K., female, 5 years old. Birth and development normal. Perfectly well until March 10, 1914; except that she had occasional headaches during the past winter and was restless in her sleep. During last week in February, 1914, she had a mild attack of chicken-pox, from which she entirely recovered. About March 10, 1914, she began to walk aimlessly, as if she could not see well. Eyesight gradually grew worse. Mother thinks that she can see only with left half of eyes, for she stumbles against things with her right side and holds her head toward right. Head is slightly retracted. She had some difficulty in walking and in climbing on bed. Her left arm is slightly affected; uses it akwardly. Her left leg is spastic. Back muscles are rigid. Drools from left side of mouth. Cranial nerves normal except mild paresis of left seventh. Background of eyes normal. Bilateral Babinski; no ankle clonus; bilateral increased knee jerks; no sensory disturbances; Wassermann in blood negative.

Spinal fluid pressure increased, no globulin excess; no lymphocytosis; Wassermann negative; colloidal gold curve normal.

Fifth Child: M., boy, 4 years old next May. Well except an attack of eczema when three months old, lasting one year, from which he gradually recovered.

Sixth Child: O., girl, 2 years old next May. Birth and development normal. Began walking at sixteenth month. About first week in December (1913) (when patient was 20 months old) left leg commenced turning out, patient walked stiff, left knee would bend backward; finally whole leg became awkard. About 2½ months later, right knee commenced bending in, and child had a tendency to fall backward; became frightened and would not walk any more. In the early part of March, would still stand up at a chair, but has not attempted this for the past three weeks. Now is unable to sit up alone. A short time after, right leg became involved; left arm became affected and spastic, with contractures of the flexor muscles of the hand. During the past week, fingers of right hand are also commencing to show the same tendency. Child is restless and cries frequently during the night. All examinations negative except spasticity of lower extremities. Wassermann in blood negative. Spinal fluid not examined. Temperature and pulse of all patients normal. Wassermann in blood of mother negative.

Spastic paralysis with increased reflexes and no sensory disturbances was described by Charcot under the name of spastic tabes and by Erb under that of spastic spinal paralysis. The cases of Gee, Newmark and others clearly indicate the familial character of the disease, also that it is due to a congenital tendency. The disease may occur in infancy, childhood or adult life. Usually all the children in the family do not become affected; rarely, it is transmitted from father to sons, as in Gee's case. In the family under consideration, which was composed of three boys and three girls, the latter alone were affected.

The classical syndrome of this disease if spastic par-

alysis of the lower extremities, often involving the trunk muscles, ocasionally the upper extremities and sometimes the face muscles as well. The muscles of the upper and lower extremities, as in the cases reported, are hard and resist passive movements. Reflexes are increased; ankle clonus and Babinski are commonly present. Pes equinus and adductor contractions occur. Some patients soon become bedridden, while others may walk for some time. Optic atrophy may occur; as may also weakness of the eye muscles, nystagmus, vertigo, idiocy, speech defects, bulbar symptoms, atrophy of the small muscles of the hand, bodily defects, kyphosis and scoliosis. Sensation is normal and there are usually no involuntaries. The familial characteristics are clearly evident in these patients, although no definite fault could be discovered in the racial line of either parent. Physical peculiarities have, however, been observed in individuals, some of whose relatives were affected with familial nervous disease. Loss of knee-jerks has been observed.

PSYCHIATRY.

General Considerations.

Progress in Teaching Psychiatry. Adolph Meyer[1] says:

(1) Jour. Amer. Med. Ass'n., Sept. 15, 1917, p. 861.

"Psychiatry can not limit itself to the traditional asylum-diseases. It has become the medical study of all types and forms of disorders or involvements of the total behavior and mentation, from the simplest, we might say normal defects and difficulties of adaptation, to the more sweeping affections, some of which *may* disqualify the patient for being his or her own safest guide and adviser and then may enter the category or temporary phase of committable disorders.

"The second year course of the medical student includes the method of recording a medically useful biography, of using the standard tests of intelligence and motor performance, of making out the principal facts and determining factors of a normal individual's make-up and reactive tendencies.

"The third year course deals with the standard reaction-types or reaction-complexes of psychopathology and the factors entering into them.

"The fourth year course takes up the general routine of cases, and the study of special problems and an individual study of at least six cases by each student.

"The principal departure from tradition is the inclusion of normal psychobiologic adaptive problems, and the getting away from the dogmatic notion of 'one person one disease' dictated by a classification-ridden tradition, and from a nosology which neglects too many points important for the understanding and treatment of the actual patient.

"Hence, we should say that the student is led to recognize the facts and factors entering into the simple entities and combining in the more complex disorders, so that he may get a dynamic as well as a structural conception of the patients whom he is called on to treat.

"One of the principal consequences of this mode of instruction is that the students frequently find patients in other divisions of the hospital who, according to their impressions, should be referred to the psychopathologic or psychiatric department, especially many of those patients who, according to the internist or surgeon 'have nothing the matter with them,' but who should not be sent away without a study of their psychobiologic adaptation. It is probably not practicable to transfer all these patients; hence, why not get accustomed to *use* the psychologic training wherever it is needed? We have to realize that in all branches of medicine, physicians are expected to apply psychopathologic methods, just as modern psychiatrists make use of all the methods and experience presented by the other departments of medicine, even if the patients have mainly psychopathologic problems.

"Another consequence is that quite a few students begin to see, in conditions which are looked on as normal or as merely nervous, possibilities of readjustment which may become of inestimable value to the patient and in the interest of preventive medicine and hygiene because the worker is put into the position which enables him to deal with the component factors before the full-fledged traditional pictures have established themselves, and have begun to overawe both patient and physician."

Mental Hygiene. In speaking of mental hygiene Henry M. Friedman[2] feels that it is hard for many to conceive of the applicability of so definite a term as hygiene to the heretofore vague and nebulous conceptions of the mind. The field is wide and varied. It embraces hygienic breeding, actual hygiene of the body, prevention of disease and correction of defects, moderation in the use of food, drugs, and alcohol, abstinence

(2) Med. Record, Nov. 18, 1916, p. 884.

from excesses of all kinds, general improvement of social conditions, proper mental, physical, and vocational training. It also embraces the segregation of the mentally defective and the mentally disordered in proper institutions or hospitals for observation, diagnosis, and treatment, so that they may not be in position to exert a deleterious influence on others. It includes, further, the teaching of right and proper methods of thinking, the training of even temperaments, the encouragement of healthful interests, proper introspection, and the discouragement of improper, artificial, or masturbatory mental habits. Neither school training alone nor home training alone is sufficient to carry out this aim; but both must work in intelligent coöperation.

The elements in mental hygiene are, then, the eradication of the hereditary element by restricting propagation by known defectives, by eliminating the disease, the drug, the alcoholic and the excess factor in acquired mental conditions, by the exclusion of alien foci of "infection," by the improvement of general hygienic and social conditions, by proper physical, mental, and vocational training, by voluntary admission of the preinsane into psychopathic hospitals and the subsequent follow-up work, by psychotherapeutics wherever possible and, lastly, by a better understanding by the profession at large of the various phases of mental disorders and their early recognition.

Some New Fields in Neurology and Psychiatry. Thomas W. Salmon[3] thinks that psychiatry has a most important part to play in the great movements for social betterment which we see being undertaken with such high hopes and with such wide popular interest and support. In some of these movements—mental hygiene, provision for the feeble-minded, eugenics, the control of inebriety and the better management of abnormal children—the part of the psychiatrist must be that of leadership not only in research but in the formulation and to a certain extent in the execution of policies. No other science provides so direct an approach to the problems which must be

(3) Jour. Nerv. and Ment. Dis., August, 1917, p. 9.

solved before these movements can succeed. In problems such as those of the treatment of criminals and the prevention of crime, prostitution and dependency, the part of the psychiatrist is to lead in research and to contribute information and guidance whenever it appears that mental factors exercise important influences. It is above all things essential that the psychiatrist should not have the phases of these problems on which he is to work arbitrarily assigned to him by others. He must obtain a view of the *whole problem* and must make for himself the decision as to which factors are those which can best be understood by psychiatrical study or managed by the methods of dealing with conduct disorders which psychiatry has developed in its long experience with mental diseases and other abnormal states.

These social tasks can not be evaded by psychiatry. Indeed, there seems to be no tendency on the part of psychiatry to evade them, but willingness to aid is not enough. There must be men available—men with sound scientific training, energy, tact and vision. To extend frontiers—whether of a country or a science—frontiersmen are required. Frontiersmen must have idealism, courage and resourcefulness. Without such workers psychiatry will not be able to make valuable contributions in this new field of useful effort. Already, with but the first awakening of popular recognition of the need for psychiatrical aid in dealing with these problems, there are too few workers to meet the demands. Unless, without delay, the medical schools and especially the psychopathic clinics and hospitals undertake to supply the high type of specialized training required, we shall find ourselves in the predicament in which preventive medicine was placed when the demand for workers in hygiene and sanitation far outran the supply of hygienists and sanitarians. The existing official health agencies were nearly stripped of their available men, and there can be no doubt that sanitary progress in this country was seriously impeded by the insufficient supply of workers in the fields which were rapidly opened. The shortage still exists, but public health courses are being formed in the medical schools and there is now

a steady flow of young men trained for useful work in this field.

Variations in the Sensory Threshold for Faradic Stimulation in Psychopathic Subjects. In his first study the following conclusions were drawn by G. P. Grabfield[4] in regard to this group: "The average threshold for alcoholic cases was 252, and among alcoholic cases the polyneuritic or Korsakoff cases ran highest. Upon withdrawal of alcohol and in convalescence the threshold falls, and the method may even have practical value in gauging the degree of progress toward recovery in the delirium tremens group."

Throughout this work, the threshold has been expressed in beta units, and, of course, the higher the figure the less sensitive is the subject. One beta unit is the average amount of shock necessary to cause a minimal contraction of a frog's gastrocnemius stimulated through the sciatic nerve in the well-known nerve-muscle preparation. Thus it will be seen that these units have a physiologic basis.

The average human threshold for the fingers in these electrodes was found by Martin, Porter, and Nice to be about 100 beta units at 2:00 p. m. It was later found that this threshold had diurnal and nocturnal variation which correspond closely with the diurnal and nocturnal variations of the nervous system as observed by other methods. It was also found that general fatigue raised the normal threshold to a marked degree but not to abnormal figures. All the present observations were made at a time when the threshold is at a high point in the daily rhythm, *i. e.*, between the hours of 4:00 and 8:00 p. m. It has been found by Dodge and Benedict that the normal threshold is raised by alcohol, and by Martin, Grace, and McGuire that a similar effect is demonstrable after the ingestion of acetphenetidin. From these last two observations it will be seen that the following evidence has a solid experimental basis.

He concludes:

1. The alcohol psychoses show a pathologically high sensory threshold for faradism for varying periods after

(4) Jour. Nerv. and Ment. Dis., May, 1917, p. 410.

the withdrawal of the alcohol. Acute alcoholic excesses do not appear to raise the threshold to a pathologic value. The thresholds of cases having other psychoses complicated by chronic alcoholism often show that alcohol raises the threshold above the general level of the group to which such a case belongs.

2. In convalescence from the alcoholic psychoses the threshold falls, reaching a normal value if recovery takes place. This fall appears to follow a smooth curve in the delirium tremens and acute hallucinosis cases and shows irregular variations in the protracted Korsakoff cases. In cases of other psychoses complicated by chronic alcoholism, the threshold falls to the level of the other cases in the group to which the particular case belongs, after the withdrawal of the alcohol.

3. This test appears to have practical value in gauging the rapidity and time of recovery in the alcoholic psychoses.

Psychoneurosis, Psychosis and Mental Deficiency in 2,000 Cases Considered, Especially from the Standpoint of Etiologic Incidence and Sex. The series of cases studied by Alfred Gordon[5] consists of 1,100 cases of psychoneurosis, 660 cases of psychosis and 240 cases of mental deficiency with morbid psychic manifestations.

In the group of psychoneurotics an inquiry was made with regard to predisposing factors. In the largest majority of cases (700) a morbid heredity could be traced. Psychoses, alcoholism, constitutional diseases—such as diabetes, pernicious anemia, gout, malignant neoplasms, syphilitic manifestations—could be revealed in the family antecedents. Psychoses and various psychic manifestations predominated. Two hundred and fifty individuals presented a personal history of alcoholism or syphilis, or both, but without a morbid heredity.

Gordon considers the factors which played an immediate rôle in the development of the psychasthenic manifestations, among which he mentions disappointments of various sorts occurring against all expectations, 575 cases; constant state of anxiety about the health of close relatives or children, constant fright, loss of fortune or

(5) Amer. Jour. Insanity, April, 1917, p. 721.

of ordinary means of livelihood, sudden changes in the pre-existing element, the sight of mutilated animals or human beings, seances of spiritualism or hypnotism, dreams of a frightful character, disastrous results of political elections, loss of positions held for several years, fortune-telling, an unexpected imprisonment, sudden meeting of creditors, assault and battery.

Considering the various psychoses of his series of 600 cases the etiologic incidents immediately preceding the onset of the disorder were not identical in all and did not possess the same essential characteristics. The cases of manic-depressive insanity showed incidents of a depressive character to precede the onset of the psychosis. In dementia praecox the greatest number gave no history of disturbances immediately preceding the onset of the mental affection, but in fifty-six cases factors of an exacting character could be traced, such as preparation for college entrance, competitive examinations, uninterrupted strenuous mental application during the evenings and late at night for months in succession. In twenty-five cases of acute confusion with delirium was seen febrile diseases of acute infectious character, such as typhoid, pneumonia, grippe (twelve cases), trauma (five cases) and prolonged hard physical labor without recreation (eight cases).

The following factors were observed as etiologically connected with the depressive states: Sudden misfortunes, disappointment in love, fear of becoming insane, fear of developing tuberculosis, etc. Functional nervous diseases, insanity and alcoholism were present either in the family or in the individuals themselves.

Dynamic Psychology and the practice of Medicine. In a clear and concise discussion of dynamic psychology and the practice of medicine H. Douglas Singer[7] gives, in simple language, a broad statement of fundamental principles which may serve to permit a more intelligent consideration of details which often seem so mysterious and obscure. The difficulties disappear as soon as one grasps the fact that mind and body are not separate and distinct entities, the one guiding the other, but con-

(7) Jour. Nerv. and Ment. Dis., April, 1917, p. 324.

stitute an inseparable, harmonious unit, this unit being activated by a single force or purpose, *viz.*, the maintenance of life.

It can not be too strongly emphasized that mind is not a separate something with mysterious powers and a wonderful vocabulary. There can even be no question of psychophysical parallelism, or the influence of mind over matter. Mind is nothing else than the brain in action for the purpose of coördinating the activities of the effector organs of the body with the conditions of the environment. The entire purpose of the nervous system is the activation of the effector mechanisms of the body adequately to meet the conditions of the environment under which the maintenance of life has to be sought. The brain is merely a more complicated mechanism evolved for the more efficient accomplishment of this purpose and the fact that brain activities are conscious does not in any way alter the principle involved.

Consciousness or brain activity serves the especial purpose of permitting a better grasp of the conditions to be reacted to, by arousing memories of past experiences of similar kind, together with memories of all of the possibilities in the way of reactions and their consequences with which we have in any way become acquainted. The selections of the particular reaction to be made is based on the identical laws which govern all body activity, the sum of which is that that reaction follows which promises, in the light of the experience of the individual, to offer the best chance of securing the satisfaction of the fundamental law of the maintenance of life. Consciousness is merely the means of using individual, as opposed to inherited, experience in the selection of the best mode of response and does not alter the general principle of nerve activity.

Dynamic psychology is largely a study of emotional reactions, and it is therefore important to make clear what one is to understand by emotion. Emotion is not merely a state of mind, but an especially vigorous adjustment of the whole effector mechanisms of the body, glandular as well as muscular, toward meeting some situation of especial importance.

These phenomena of emotional adjustment may be primitive and inherent in the situations themselves, in which case the modes of reaction are provided by inheritance. On the other hand, changes in the environment may acquire interest as the result of experience by the individual that they have a definite bearing upon his ability to maintain the life of his race and of himself.

This is one of the most important problems in psychology and lies at the root of the modern views of psychopathology as elaborated by Freud, Jung, Janet and others. It is customary to speak of the maintenance of life as an instinct inherent in all living matter, and we must simply accept it as an axiom. It is generally subdivided into two parts, *viz.*, self and race preservation, although these are intimately related to one another. There is, then, a (not necessarily conscious) inherent striving for the maintenance of life which becomes, in the animal provided with a human brain, a feeling of desire or craving. It is still the same force, unaltered by the fact of unconsciousness, and may be regarded as the driving power leading to all activity whatsoever. Pleasure and pain, satisfaction and dissatisfaction represent consciousness of success or failure of this craving and are the foundations of our whole emotional life.

If one is to gain any comprehension of dynamic psychology, it is essential to grasp this fact and to realize that this craving or desire, libido as it is now being called, is not some new mysterious mental weapon created by the psychopathologist, in spite of the elaborate vocabulary he has built, but is the common property of all living matter.

The preservation of race and self must be accomplished at the expense of the environment in which the individual is placed, and since much of this is hostile and inimical, there has to be maintained a constant struggle. The effector mechanisms of man, including his circulation, respiration, digestion, excretion, and reproduction, differ but little from those of other mammals, and we may regard these as modes of adjustment selected unconsciously as the result of the experience of innumerable generations of ancestors.

But it must be remembered that such modes of adjustment, being the result of general experience, must frequently be inadequate in the experiences peculiar to the individual and it is for the purpose of a more labile adaptability that the mechanisms of the brain have been especially evolved.

We must then recognize that there is going on a constant organization of our experience of situations and the results of reactions to them with the tendency to establish more and more clearly certain habits of adjustment. Obviously, the possibility of forming such habits is greatest in the earliest years of life, and variations become less likely as age progresses. All these adjustments, from what has been said above, represent nothing else than efforts to satisfy the cravings of race and self preservation.

From these introductory remarks concerning fundamentals, Singer goes on to consider points of immediate practical interest. First may well come the meaning of what are termed convictions or beliefs. A belief represents a conclusion reached with regard to some particular situation or group of situations. In other words, it represents a mode of adjustment already selected. Conclusions may be more or less important in the struggle for the preservation of race and self, or, to express this in conformity with what has already been stated, they may have more or less emotional coloring. This implies not merely a state of mind, but an attitude of the whole body. This state of the body is part of the belief and quite inseparable from it. The greater the biologic interest belonging to the conviction, the greater the intensity of special bodily adjustment and, further, the greater the interference with carrying out other adjustments of the body not in harmony with the attitude assumed.

He next passes on to a brief statement of a further principle which though more complex is of even greater importance. As evolution has progressed and the struggle for life has become more severe, there has appeared, very gradually, a system of coöperation among individuals for mutual assistance and protection. This sys-

tem of social or community life brings, besides the advantages which led to its adoption, certain restrictions upon the activities of each individual. The instinctive desires and cravings, the libido or force of life, inherent in each individual lead of necessity to conflicts between the members of the society. This, necessarily, has caused the development of certain regulations and restrictions upon the activities of the individual in order to preserve the social union. To put it simply, man, like other living organisms, is striving for the satisfaction of libido, but is required by the social conditions of his existence to control his appetites. He is required to gratify them only under certain restrictions which constitute what are called the laws of society. In other words, he must under certain conditions repress them.

Necessarily, those desires which are most subject to regulation or repression are those which are strongest, for this means those which are reacted to most violently and therefore are most likely to lead to discord and conflict in society. Hence, one need not be surprised that social regulations fall especially heavily on the reproductive instincts and that repression is most marked in, though not by any means limited to, this sphere as ordinarily understood.

Denied by social regulation, the frank expression of undiminished libido, how does man react? Throughout life there is a constant preparedness to fulfil the demands of libido, to create and take advantage of opportunities for its gratification. This must, of course, mean that there is a fluctuation from time to time in the intensity of appetite and emotional adjustment. This fluctuation depends, in part, upon conditions inherent to the structure of the body and in part upon accidental conditions of the environment. The possibility of creating opportunities for the gratification of libido is essentially the outcome of consciousness which, as we have seen, affords the mechanism for postponement of reaction or futurity. Man thus takes an interest in, or has an emotional attitude toward, the tilling of the soil in order that he may have the opportunity to eat in the future.

There is thus the substitution of one activity for an-

other, which might be described as a more natural mode of adjustment. This principle of substitution, here but vaguely indicated, is one that comes to play a very large part in determining human conduct.

Differences in the particular character and methods of selection of substitute reactions are some of the main features in defining differences in types of personality. The understanding of these mechanisms has, Singer thinks, been unnecessarily obscured by too much emphasis upon the question as to the awareness of the individual of the meaning of the substitutions which he practices. This question is one of great interest and has given rise to the use of such descriptions as unconscious, subconscious and co-conscious activity by different writers. Nevertheless, it may be pointed out that it is from the patient that the meaning of such obscure reactions is always learned, if it can be learned at all, and one can only conclude that being capable of being recalled to memory it must, at some time, have been within his conscious experience. It rather seems that, where the question of unconscious substitution could be raised the emotional expression is so repressed that the individual does not admit the real facts of his desires or longings even to himself.

The types of substitutions we call helpful, practically include all activities which represent the conversion of individual libido into social interests, the substitution of the welfare of society for that of self. For that reason such substitutions have been described by Freud as "sublimations." The harmless group are important as explanations of many oddities of conduct and behavior and will include many hobbies and habits which may otherwise seem inexplicable.

The third group is by far the most important to the physician, for it includes the adoption of attitudes which render the individual more or less incapable of social existence. In them will be found the explanation of many conditions of functional disorder (often called functional disease), the manifestations of which represent substitutes for libidinous gratification. The diversity of type is well indicated by the names given to the

different groups which will include hysteric, psychasthenic, neurasthenic, paranoic and dementia praecox modes of reaction, besides other less well-differentiated forms.

Modern Conception of Inebriety. Gregory,[8] calling attention to the fact that alcohol and intoxicants, by reason of the peculiar state of mind they produce, have been utilized by men as one of these means of refuge from the realities of life. The action of alcohol on the human mind is that of a great dissociator of function; it reduces man to his elemental principles. It thus changes for man the outside world. It pushes facts and verities away from consciousness. It enables the individual to get away from the realities. It artificially creates a new world in which the pleasure instincts have their full sway unrestrained by the control of intelligence. In other words, alcohol accomplishes this fact by temporarily intensifying the desire of the pleasure principle, first for an abundant and wider life, and, second, by the so-called narcotic motives when it suppresses the pain and thus indirectly promotes the pleasure principle.

The intoxication motive, then, is closely related to the primal impulses. If this be granted, we must regard alcoholism and inebriety as essentially psychologic problems. Further, the intoxication motive may be replaced by higher and nobler impulses. That this is not a fanciful hypothesis and can be substantiated by actual facts is indicated by the relation of religion to inebriety. The most frequent, lasting and successful cures of inebriety are brought about by religious influences.

Absurd it would be to treat an individual inebriate from the physical standpoint alone and to inform him quite strongly that if he has any character left he will be able to help himself, inasmuch as we know that inebriety is a psychologic and characterologic disorder from the very beginning. On the contrary, we should realize that the treatment is but only just begun; that his psychology must be delved into, that his conflicts and difficulties must be uncovered and made manifest to the

(8) New York Med. Jour., Vol. 105, p. 626.

patient himself—be they personal or environmental, inherent or acquired, be they on the surface, such as social maladjustment, ennui, vocational discontent, or more serious and deepseated, as sexual maladaptation, mental defect, instability, and a host of kindred conditions. Moreover, it is evident that it will not suffice merely to take away the alcohol through restraint in hospitals or farm colonies, unless in addition we analyze, reconstruct, and reeducate his personality, attempt to create new healthy environmental conditions and thus teach him safer flights, escapes, and sublimation on a higher plane.

It is doubtful, however, if prohibition will ever be effective unless some substitute is offered, for in legislating against the alcohol habit, we are attacking a problem which is based on instinct itself. It is not the motive at the root of inebriety that must be done away with, but the inebriety; it is not the intoxication motive that is an accident, but the alcohol; or, more properly speaking, a process of evolution which has been in many ways beneficial, but has outlived its usefulness. Emphasize very strongly the principle that inebriety can not be overcome simply by withholding the alcohol; it can only be destroyed by being replaced; the intoxication motive must find another outlet.

The inebriate who has been deprived of alcohol without an adequate substitute to satisfy the intoxication motive may, to use the Scriptural words, be visited by seven additional spirits more wicked that the previous one, who, finding it unoccupied, enter and dwell in him, "and the last state of that man is worse than the first."

The Continuous Bath in Mental Disease. In discussing the value of the prolonged mental bath Edward A. Struker[9] says that probably the best results were obtained in his cases in conditions of confusion and restlessness, frequently associated with considerable physical debilitation. The infective-exhaustive group furnishes a good illustration of this type. After five or six hours in the tub, the majority of such patients became quiet and drowsy, and often fell into a sound slumber shortly after being placed in bed.

(9) Jour. Amer. Med. Ass'n., June 16, 1917, p. 1796.

The manic phase of manic-depressive insanity responds to the continuous bath in something more than half of all cases. With some observers the experience has been that the excitement is allayed only during the treatment time, and then continues as before.

In dementia praecox the baths were employed mainly for the relief of the episodic excitements of the catatonic form, in which they were moderately successful, and to combat various vasomotor disturbances in which their effect was highly beneficial. Not only was cyanosis improved, as Adler demonstrated, but the tendency to coldness and sweating of the extremities, oiliness and coarsening of the skin texture, and in one case, marked dermographia, were all much lessened. In paresis the baths are valuable not only in controlling the disturbed periods, but also in maintaining an active, healthy condition of the skin, which especially in the late stages of the disease is prone to trophic degenerations. The most unfavorable cases for tub treatment are the apprehensive, agitated states which occur in the involutional and presenile depressions and the senile dementias.

Kraepelin regards any existing ear diseases as a contraindication. Most clinicians interdict the baths during the menstrual period. After the menses have been well established, however, there seems to be no good reason why a greatly excited patient should not be given moderate tub treatment. Advanced cardiac and pulmonary disease constitute prohibiting conditions, but even markedly arteriosclerotic patients have not shown any ill effects.

He concludes that the continuous bath is the most satisfactory method we have of treating the fairly large group of excited states which are encountered in many of the psychoses.

Histologic Examination of the Ovaries in Mental Disease. It appears by the results obtained by Laura Forster,[1] where there is disease of the brain or mental incapacity associated with it, the power of the individual to reproduce her kind, if not absolutely cut off, is at least

(1) Proc. Roy. Soc. Med., May, 1917.

diminished and in most cases an early cessation of ovarian function seems to take place. Forster thinks that her findings show that there is an intimate relation between the ovaries and the brain and confirms Ceni's statement on this point.

Mott, commenting upon this article, states that it would be well in future investigation to determine whether in certain forms of insanity, such as dementia praecox, a primary degeneration of the ovum occurs which would be recognizable in the immature follicles.

Fatty Degenerative Changes in the Purkinje Cell Belt of the Cerebellum in Exhaustive Infective Psychoses. Exhaustive infective psychoses, presenting as they do, asynergic symptoms, as tremors, asthenia, atonia, ataxia, seemed to offer a good field for the study of cerebellar changes, and it was suggested to Egbert W. Fell[2] that such a study in toxic states of various sorts would be of value in determining: (1) What element of the cerebellum was most affected; (2) the frequency of fatty change; (3) the extent of that change; and (4) its relation to glia cell increase.

The material at hand consisted of six cases and includes various toxic and exhaustive conditions.

1. Fatty changes of a type described in detail above occur in the cerebellum, especially in the Purkinje cell belt, in conditions which interfere with the nutrition of the brain, as arteriosclerotic brain disease, senile dementia, and in exhaustive infective psychoses.

2. The fatty changes are more marked in the toxic group than in others examined.

3. The more acute the process, the more marked is the fat deposit.

4. In chronic cases the fat deposit may not be large, but as cell destruction advances, the number of glia cells increases.

5. This study demonstrates in a new way the great liability of the Purkinje cell region, of which there has been increasing evidence from other methods of investigation for many years past.

(2) Boston Med. and Surg. Jour., Vol. 175, No. 23, p. 819.

The Ability of Brain Tissue to Take Up Water in Delirium Tremens and Other Conditions. A study of cerebral edema. Brain tissue from approximately 150 bodies was studied by Frank Nuzum and E. R. LeCount,[3] who conclude that a gross edema of the leptomeninges, "wet brain," was present in 45 per cent. of the brains used in this study. The brains of twenty persons dead from delirium tremens, removed from the body on an average twenty hours afterward and immersed in distilled water for forty-eight hours, show hydration capacities exceeding those observed in any other condition encountered among 130 miscellaneous necropsies, with the exception of three instances of uremia, one of morphine poisoning, and those of cerebral embolism and hemorrhage.

The brains of rabbits dead of experimentally produced chronic alcoholism (daily intoxicating doses of alcohol by stomach for from two to four months) were not grossly edematous, but possessed a post-mortem hydration capacity even greater than that of human brains, and 8 per cent. in excess of normal rabbit brains.

These indications of an alteration of the hydration capacity of the brain colloids may be assumed to be the result of tissue asphyxia and the resultant accumulation of acids secondary to the action of the narcotic alcohol. Such an interpretation is in some measure supported by the very high hydration capacity observed with uremia in which clinically an acidosis is known to exist.

The Wassermann Reaction in 1,266 Consecutive Admissions to Elgin State Hospital. Of the 1,266 cases reported by Egbert W. Fell,[4] the paresis patients proper, had positive fluid in 96 per cent. of the whole syphilitic group, 93.8 per cent.

In the syphilitic group 3.7 per cent. had both the serum and fluid negative and 88.2 per cent. had both the serum and fluid positive.

In the differentiation of cases in insane hospital work the following were found to be practical working rules:

(3) Jour. Amer. Med. Ass'n., Dec. 16, 1916, p. 1822.
(4) Jour. Ment. and Nerv. Dis., June, 1917, p. 536.

1. A positive serum Wassermann usually indicates paresis, especially in males.
2. A negative serum does not exclude paresis.
3. A positive fluid Wassermann practically always indicates paresis.
4. A negative fluid practically excludes paresis.
5. A positive fluid Wassermann is by far the sign most constantly present in paresis and constantly absent in other psychoses, which fact makes the laboratory findings more reliable criteria for diagnosis in *doubtful organic cases* than uncertain clinical signs.

The mistake is more likely to be made clinically of calling a case paresis when it is not than of calling paresis something else. An organic case *with physical and mental findings uncertain, but suggesting paresis,* which on examination of the spinal fluid shows a *negative Wassermann* is very much more likely to prove *not* to have a syphilitic involvement of the cerebrospinal axis.

The Korsakoff Syndrome. (Toxemic Cerebropathy in Pregnancy.) A case of Korsakoff's psychosis occurring in a young woman twenty-five years of age during her second pregnancy is reported by Eugene Riggs,[5] who concludes that toxemia developing during the course of many diverse pathologic states may give rise to the Korsakoff syndrome, mental and nervous reaction being determined by the acuteness of the case. As to the nature and toxicity of the findings and toxins, we are absolutely ignorant.

When the Korsakoff syndrome and peripheral neuritis are observed during gestation and the puerperium, pregnancy must be regarded as an important etiologic factor. The multiple neuritis may be local or diffuse and may or may not be related to psychic disturbances. Most generally it occurs alone. Ocular manifestations of toxemia in these cases generally possess a grave significance. The prognosis is almost invariably good if an early delivery is affected.

Finally, patients who have suffered from pernicious

(5) Amer. Jour. Insanity, January, 1917, p. 525.

vomiting and other toxic symptoms should be advised to avoid future pregnancy.

Psychiatric Aspects of Pellagra. In a series of 160 cases reported by William C. Sandy[6] the infective exhaustive psychosis was the most frequent, occurring in 35 per cent. The prognosis is often grave, especially when symptoms of cerebral irritation or central neuritis develop.

The manic-depressive psychosis was seen in over 11 per cent., the depressed type being more common than the manic. In this series the senile psychosis appeared in 10 per cent. Dementia praecox, or allied conditions, in over 12 per cent., and over 14 per cent. were left unclassified.

It is important to realize that the presence of pellagra in any case is apt to modify not only the course and clinical picture, but to alter seriously the prognosis.

Observations on the Relation Between Syphilis of the Nervous System and Psychoses. Of about 2,500 cases examined, Lawson G. Lowrey[7] reports eleven cases for this particular study. Of these, four had clinical pictures of dementia praecox, one of constitutional inferiority, one imbecility, two organic and three paresis. In two cases of dementia praecox the serology of neurosyphilis was found early; in the other two only after many years. One patient has tabetic symptoms; the other patients have no symptoms of neurosyphilis. One hysterical or constitutionally inferior person developed secondary syphilis five years before death; no clinical symptoms followed. An imbecile developed genuine paresis in the hospital.

Calling attention to these and certain other cases giving the serology of neurosyphilis, Lowrey says that we have to do with neurosyphilis in unusual causal relationships or coincident psychoses, and symptomless neurosyphilis, and that the diagnosis should be based on both clinical and laboratory findings.

Psychiatric Family Studies. To attempt a statistical analysis of cases in which the data are more or less incom-

(6) Amer. Jour. Insanity, April, 1917, p. 609.
(7) Ibid., July, 1917, p. 25.

plete is, in the opinion of A. Myerson,[8] an error. However, in this paper he attacks only very definite psychiatric problems, the answer to which he does not in the least presume to make full or final. The first question is: Given a certain type of mental disease in an ancestor, what form of mental disease is to be expected in the direct descendant? First, he records the paranoid psychosis and concludes that following paranoid disease in the immediate ancestors dementia praecox or a paranoid condition in the descendant has followed. The disease in the descendant usually commenced earlier and was generally worse than in the ancestor. He compares these findings with those of other workers, and formulates their results as follows: "Paranoid condition in the ancestor precedes dementia praecox in the descendant."

Considering dementia praecox in the ancestor, the study of twenty families points very clearly to the conclusion that dementia praecox breeds true, for it is followed in the great majority of these cases in which insanity occurs in the next generation by dementia praecox.

Thus, it may be stated that the two main trends are to manic and dementia praecox. His own case causes him to be certain that the clearly uncomplicated manic depressives are followed by manic depressives. All authors agree that idiocy, feeble-mindedness, etc., followed much less closely on a manic depressive than a dementia praecox.

Relative to the involutional psychoses, the insane descendants of patients with involutional melancholia or involutional psychosis in general, even aside from those cases that are diagnosed as dementia praecox suffer practically always with dementia praecox.

Finally, it appears that all roads seem to lead to dementia praecox and from thence to imbecility.

The Abderhalden Reaction in Mental Diseases. Henry A. Cotton, E. P. Corson White and W. W. Stevenson[9] conclude:

(8) Amer. Jour. Insanity, January, 1917, p. 355.
(9) Jour. Nerv. and Ment. Dis., February, 1917, p. 144.

1. The Aberhalden reaction gives certain definite and uniform results.
2. These results are practically negative except in dementia praecox and epilepsy.
3. In dementia praecox 81 per cent. of the cases show a positive reaction to sex gland, and in three cases out of fifty-five gave a positive reaction of thyroid and sex; two of these were the katatonic type. Differential count of the blood shows rather characteristic conditions in dementia praecox; *i. e.*, high red blood cells, low white cells, and high lymphocyte count and low polymorphonuclear.
4. Our knowledge at present of the incidence of tuberculosis in dementia praecox justifies the hypothesis that probably the former stands in some etiologic relation to the latter.
5. In epilepsy practically all cases, sixty-nine, gave a positive reaction to adrenal gland.
6. The value of these reactions is to lay the foundation for therapy, based on the facts deduced.

Mental Defect and Delinquency.

Syphilis as an Etiologic Factor in Mongolian Idiocy. J. E. McClelland and H. O. Ruh[1] wish to go on record as opponents to the recent views of Stevens, who tries to incriminate congenital syphilis as the underlying cause.

They conclude that from careful anamneses, physical examinations and the laboratory tests now available, it can not be stated at the present time that Mongolism is due to congenital syphilis.

The Degenerates: Born Delinquency and Criminologic Heredity. To what degree is there sense and substance in the talk about "born degenerates," "born criminals," "moral insanity" and innate antisocial tendencies, asks I. Victor Haberman[2] for in this heritable connection the facts are eminently important for us—and segregation, castration, etc., in the hope of

(1) Jour. Amer. Med. Ass'n., March 10, 1917, p. 777.
(2) Archiv. Diagnosis, 1917, p. 218.

ending such dangerously tainted stock. In brief, what is the problem of degeneracy, and what are the facts in criminologic inheritance?

Such individuals harbor a heritable potential tilt to psychopathy, or have quite outspoken evidence of faulty mind. Where abnormal *variability* and *lability* are pronounced, the literature speaks of *instabiles;* where an unevenness of character is the chief flaw, then of *déséquilibrés.* Still others, through inability to profit by experience, are the *indisciplinés* or *incorrigibles.* If such individuals are normal in intelligence, they are *dégénérés superieures,* if feebleminded, *dégénérés infereures.* The *degenerescence* in them is synonymous with taint, *Belastung* or *"noxus hereditas or paternus."*

What distinguishes its members is an abnormality in the mental dynamics, in the *psyche,* an abnormality in mental reaction, either an over-reactionability or inadequacy of reaction, or again, unusual tendencies in ideation. These abnormal thought processes—this *psychopathy*—manifests itself, in a measure, after the pattern of the various neuroses and psychoses, but only very rarely goes over into the latter. It constitutionally affects the individual, however, colors his mental make-up and *characterizes* him. Hence Kraepelin termed these individuals "abnormal characters" or "abnormal personalities." J. L. A. Koch, in the field of remedial pedagogics, applied the name "psychopathic inferiority," from which we get our anemic "constitutional inferiority." The most virile and appropriate caption is Ziehen's "Psychopathic Constitution"—a name now very extensively accepted on the continent.

He infers that there is no such thing as hereditary delinquency, or a *born criminal,* no really criminal family lines, no truly criminal stock; there is only the born psychopath—either intellectually normal, or stunted by lack of schooling, or defective—the hereditarily tainted even degenerated (*i. e.,* strongly convergently tainted) psychopathic constitution, with his uncontrollable affectivity, his lack of inhibition, his inabilty to weigh, reflect and judge, and withal, an inherent unrest, and a blind forward seething with so unarmored a front.

Environment, seduction and the perverse vicissitudes of life achieve the rest.

Granted there is no born criminal, and that neither delinquency, criminality nor the hang to wrong is heritable or transmissible, are there not individuals who are found from the very earliest to be incorrigible, unsocializable, who show no affection, and have a kind of anesthesia to feelings of sympathy, respect, thankfulness, pity, gratitude, other's pain, etc., who can not grow into moral and ethical beings because they can not comprehend or live up to the attitudes we term social, moral and ethical in our relations? Are these not the chronic recidivists of the courts, the high-handed egoists, uninfluencible through advice or punishment?

1. Cases in which there is a mental debility (or defect), the ethical defect being only part of the defectivity. These cases belong under feeblemindedness (Ziehen's *"Debilität mit vorzugsweise ethischem Defect"*).

2. Cases in which there is no intelligence-defect whatsoever, the tendency to immoral action being due not to a lack of or defective ethical feeling, but to positive psychopathic trends. These cases belong to the psychopathic constitutions, especially the hysterical or degenerative (in Ziehen's private cases they proved the majority—three-fifths belonging here).

3. Cases in which a careful anamnesis shows that these children missed certain necessary influences which make for moral and ethical character, and were open to bad influences which spoiled them, namely, poor parental training, or lack of any parental training, the misguidance of servants, bad milieu, evil companions, even seduction, etc. In such cases there is no pathologic process whatsoever present, but just a normal process of stunting and perverting (*i. e.*, thwarted ethical development—the German *ethische Verkümmerung*).

Constitutional Inferiority. In presenting the conception of constitutional inferiority Morris J. Karpas[3] says that it is necessary to emphasize the fact that the human mind is complex and intricate in structure, as

(3) Jour. Amer. Med. Ass'n., Dec. 16, 1916, p. 1831.

well as from the point of view of organic and social heredity and its adaptation to the environment.

It is not difficult to conceive how a congenital defect in the affective, or volitional, or intellectual sphere or in all spheres may produce psychic instability, and indeed to such an extent as to cause a maladjustment of varying degree and intensity. In classifying constitutional inferiority, it is advisable to be guided by the individual fundamental disorder involved in each of the three faculties. On this basis we may divide mental inferiority into three large groups, intellectual, emotional and volitional.

The intellectual type embraces a wide range of inferiority, which may differ in character and quality. Idiocy, imbecility, and moronism are examples of one extreme. The emotional form of mental inferiority presents well-defined characteristics. In some instances there is a deficiency or excess of emotional activity of such a nature as to produce distinct types of personalities. The *mental clams* form a well-known class. They are seclusive and secretive, rather timid and self-absorbed, indulge in dreams and the real world is very little source of interest to them. Such a type of personality was termed by Hoch "shut-in" and is found in a large number of cases of dementia praecox. On the other hand, there is another type of personality which is of a highly vivacious nature, and of vacillating mood. This form of mental make-up is met in manic-depressive insanity, which was also described by Hoch.

In addition to these two striking types there is another one in which emotional instability is the fundamental disorder. To this class belong the nervous and hysterical temperament and a hypochondriacal and neurasthenoid disposition. Another important type of an abnormal personality which is determined by perverted feeling is known as the psychopath, or, in popular language, the crank.

Of all the other forms of constitutional inferiority, none is so significant as the volitional type, because of its great social import. The underlying disorder is

lack of development of will-power, feeling and moral sense. There are no apparent intellectual disturbances according to the usual gross tests. However, on more searching analysis, one finds considerable superficiality, apperceptive faculty is weak, the enfeebled judgment is quite manifest when confronted with difficult situations or tasks and the stock of knowledge takes an egoistic trend. These individuals are deceitful, given to lying, contrive numerous schemes to cheat, and have no control of their primary impulses, such as the sexual and nutritional instinct. In the attempt to adjust themselves they follow the path of least resistance, and because devoid of moral sense and deficient in will-power and feeling, they commit all kinds of antisocial deeds, which are frequently determined by temptation, suggestion and environment.

In a broad sense, the volitional form of constitutional inferiority should be regarded as a psychosis, because there is a marked element of maladjustment present. It is a malignant form of mental aberration and does not yield readily to rectification. Some preferred to term it moral imbecility, moral idiocy. It is of little practical interest what such a pathologic mental condition may be designated, the fact remains that this malignant form of mental aberration is of relatively frequent occurrence and is of great social evil. A large majority of the criminal class, tramps, vagrants, prostitutes, chronic alcoholics and other degenerates, belong to this group.

Briefly consider the question of the care and treatment of such patients. It is needless to state that the most important thing is to detect those forms of mental abnormalities in the early development stages, when simple adjustment may be undertaken. Briefly stated, prophylaxis in the plastic stage is the important measure, and special pedagogic methods, religions and moral influence, environmental reconstruction and physical and manual training are necessary in the process of re-adjustment and re-education in such cases.

For the fully developed cases of the first and sec-

ond group, the actual care and treatment present less of a problem than the last class, inasmuch as many of these persons can be cared for in institutions for the insane or the feebleminded.

The volitional form of mental inferiority exerts directly and indirectly a pernicious influence on society. In the fully developed cases with definite antisocial tendencies, the individuals are incarcerated in protectories, prisons, reformatories, etc., but this in itself does not solve the problem in so far as such treatment is only symptomatic and not radical.

Moral Imbecility. In this article A. F. Tredgold[4] proposes to deal with a condition which, although for many years regarded by psychiatrists as coming within the domain of mental unsoundness, has only quite recently been so recognized by the law of England, namely, *moral imbecility.*

The cardinal feature of moral imbecility is persistent vicious or criminal conduct, in spite of punishment. Moral conduct may be regarded as the regulation of the acts of the individual in accordance with the laws and ethical standards of the community. For such regulation, two factors are necessary; firstly, the individual must be capable of appreciating these standards; secondly, he must have the requisite will to do what is right and refrain from doing what is wrong. Defect of either, or both, of these faculties may result in persistent misconduct, and since they are faculties of mind, in bringing the person so defective within the legal definition of a moral imbecile. Since these two kinds of defect result in two distinct clinical types, it will be convenient to consider them separately, under the headings:

1. Moral imbecility due to defect of moral sense.
2. Moral imbecility due to defect of will.

There is not the slightest doubt that certain persons exist who are not only lacking in moral sense, but are lacking in any capacity to develop this sense. This is shown by their absolute failure to respond

(4) Practitioner, July, 1917, p. 43.

to any form of training or external stimulus. Such persons may be reared in an atmosphere of the utmost refinement, their education and training may be of the best, judicious punishments may have been resorted to; but it is all in vain. They not only develop into inveterate liars, persistent pilferers and thieves, incorrigible swindlers, incurable destroyers of property, hopeless prostitutes, irreformable social pests of some kind or other, but they seem to be, and Tredgold believes are, absolutely incapable of realizing that the acts they commit are wrong. It may be designated *primary* moral imbecility.

We have now to consider those cases in which the defect of moral sense is due, not to any lessened developmental potentiality, but to the absence of suitable training. Whether some degree of moral sense might be evolved in a child in the complete absence of training, the author does not know. It is possible that in some individuals it might. In practice, however, it is found that the child who is deprived of suitable moral training and, more particularly, the child who is brought up amid marked criminal and antisocial influences, will grow up with a defective moral sense.

The second group of cases coming within the legal definition of moral imbecility are those in which there is a defect of will. Of these, we may recognize two clinical types; firstly, those persons who, in consequence of a general weakness of will, are unable to resist the ordinary temptations of social misconduct, which are inseparable from everyday life; secondly, those persons who are the victims of certain morbid obsessions and imperative ideas.

Defect of moral sense is the most common psychologic basis of moral imbecility. It is revealed in the early years of childhood by persistent wrongdoing of every kind. Quite small children will lie, swear, thieve, burn, mutilate and destroy without evincing the least shame or amenability to any restraining influence whatever. In addition, they will show no trace of gratitude for anything which is done for them, and

no sign of affection for any of their relatives. In a case of persistent vice or crime which is seen in later years, and in which there is a clear history of this kind, there can be no room for doubt.

There are, however, some points to be borne in mind when consulted with regard to such behavior in juveniles. In the first place, it must be remembered that the young child is exceedingly imitative. The absence of moral training and the presence of an environment in which selfishness, immorality, drunkenness, and depravity are rife will result in a non-development of moral sense, although the potentiality for such development may be present. Moreover, the fact that punishment has had no deterrent effect is not necessarily conclusive evidence that the defect is permanent in these cases. Before they can really be regarded as moral imbeciles, the effect of moral influence and suitable training must be tried.

Again, youth is not only an age of imitation, it is one of irresponsibility, of thoughtlessness, of impulsiveness, and of incomplete control.

Lastly, it is to be remarked that cases occur in which the development of moral sense may be considerably retarded. The cases in which persistent vice and crime occur as a result of weakness of will call for very little comment. The irresponsible, facile disposition of these persons is obvious. The greatest difficulty of all in deciding, will probably be experienced in those cases of stereotyped offenses which are due, or alleged to be due, to the presence of imperative ideas, or so-called irresistible impulses.

As a rule, crimes of pure wantonness are indicative of mental perversion or defect of some kind or other, whilst crimes which conduce to the material advantage of the individual, although they may be so indicative, will need to be viewed with some suspicion. Deliberation in planning, cunning in execution, and skill in evading detection, by no means necessarily negative the presence of genuine mental defect, and many moral imbeciles exhibit these qualities in a very high degree.

Insanity and the War.

Mental Disorders in Civilians in Connection with the War. Having found little reference in recent literature upon the effect of the war in the production of morbid mental states among the civilian population, R. Percy Smith[5] here records his observations and experience. The onset of the war had a particularly disturbing effect upon those who were upon the verge of breaking down or had had previous attacks of mental disorder. To many the increased cost of living and diminished income has been one of the causes leading to mental illness. Another circumstance to be taken into consideration is complete change of work or excess of work.

Another group of cases is formed by those who have foreign, in some instances German, names have perhaps suffered from some real annoyance or persecution in consequence, or have recognized the fact that their name and speech laid them open to the possibility of being looked upon as spies, and it has been an easy step from the fear of being suspected to delusional belief and the development of a definite psychosis.

Speaking of the raids by airships, he states that although the effects on individuals have been very serious, the total effect on the population has been very slight. In many cases apprehension of further raids has led to insomnia, the effect being excessive fatigue or exhaustion. This result has been much increased by any previous attack of insanity, pre-existing ill health or advancing age. In some cases he has seen a voyage in which there was fear of submarine attacks appear to precipitate a mental breakdown. He has seen general paralysis precipitated in its onset by the excitement or stress of the war, or else the war has affected the mental aspect of the patient. He states that the effect on patients already in asylums has been very slight. In summarizing these cases and many others, he has been struck by the large preponderance of the influence of heredity or previous attacks. In 61.25 per cent. of his

(5) Proc. Roy. Soc. Med., December, 1916.

cases there has either been heredity of insanity, suicide, nervous breakdown or alcoholism or a previous attack. In 37.5 per cent., there has been heredity, and in 41.25 per cent. previous attacks, and in 17 per cent. heredity and previous attacks combined. In 48.75 per cent. the patients have been over 40, the average of these being 50, and in 72.5 per cent. the patient has been over 30 years. Only six of the patients were 20. The sexes were about equally affected.

Finally, it does not appear to him that the war is responsible for causing any great amount of new insanity. The stress or stresses have merely affected those who were prepared by heredity, previous attacks, or some predisposing instability and who might have broken down in any case. On the other hand, in all probability tendencies which might have led to the development of neuroses or psychoneuroses have been "sublimated" by useful work and the ultimate effect may be a strengthening of the mental constitution of the nation.

The Study of Mental Disease in Soldiers During the Present War. Based upon the study of mental disease admitted to the Navarre asylum, E. Montembault[6] concludes:

1. War does not create any special psychosis.
2. In the present war, post-traumatic psychoses due to the violence and power of engines of destruction are extremely frequent.
3. Contrary to what was observed in 1870, melancholic forms of insanity have been more numerous than cases of maniacal excitement.
4. Most of the military patients were predisposed to insanity but many of them would probably have remained all their life free from symptoms but for the present war. Among the causes which have given rise to their mental disturbances trauma should take the first place. Psychical trauma appears to be much the most frequent, while lesions of the nerve centers are rare. Exhaustion and fatigue, which act like auto-infection,

(6) Thèses de Paris, 1916-17, No. 15; abstracted in Rev. Neur. and Psychiat., July, 1917, p. 264.

are next most important. Then come intoxications and infectious diseases.

5. The symptoms of an insanity in the military patient have almost all a war coloring which is shown: (*a*) in ideas of unworthiness, guilt and expiation; (*b*) in ideas of persecution and auditory hallucinations; (*c*) in exalted ideas.

6. The civilian patients sometimes show a war delirium analogous to that of the mobilized.

7. The prognosis of the psychoses caused by the war is favorable as a rule. The proportion of curable cases is about 80 per cent. The duration of the disease is shorter than of the psychoses seen in the civilian population.

8. The curability and rapidity of the cure of the psychoses are due: (*a*) to suppression of the determining cause; (*b*) to the age and physical vigor of the patient; (*c*) to rational treatment (isolation) applied as soon as the mental disturbance appears.

Dementia Praecox and Manic-Depressive Insanity.

The Early Differential Diagnosis Between Dementia Praecox and Manic-Depressive Insanity. The differential diagnosis between an established dementia praecox and an established manic-depressive insanity offers, as a rule, no special difficulty, according to F. X. Dercum.[7]

In by far the larger number of cases of both dementia praecox and manic-depressive insanity, the patients, no matter what other symptoms they may present, are in the earliest period in a phase of depression. If, for instance, confusion be present in ever so slight a degree, the scales incline toward dementia praecox. If, again, the attitude of mind even in the absence of clearly developed delusions is in the slightest degree self-accusatory, the scales incline toward manic-depressive insanity. Further, if the patient complains of visceral or hypochondriacal sensations, suspicion should be directed toward dementia praecox. Visceral or hypochon-

(7) Penn. Med. Jour., August, 1917, p. 765.

driacal sensations are to be interpreted as somatic hallucinations. They are rare in the depressive phase of the manic-depressive insanity of youth and exceedingly common in dementia praecox. Especially do they become significant when they are referred by the patient to causes external to himself. Such a fact at once determines the diagnosis in favor of dementia praecox. This is likewise the case just as soon as the hallucinatory sensations of the patient give rise to or are associated with persecutory ideas.

If, on the other hand, visceral or other hallucinatory sensations are absent and there is no element of confusion, the diagnosis should incline toward the depressive phase, the melancholia, of manic-depressvie insanity. Of course, if in addition a self-accusatory attitude is discovered with or without delusions of self-blame, the question of diagnosis is definitely settled.

When we turn our attention to other factors, such as age and sex, little help is gained. Manic-depressive insanity as a rule does not begin until adult life has been well reached. It is rare before 18, and much more frequent after 20 or 21 than before. If, therefore, the patient is relatively young, that is, if his age is in the range of 13 to 17 or 18 years, the presumption is in favor of dementia praecox. If, on the other hand, the age is greater than this, this element of differentiation fails, inasmuch as dementia praecox, like manic-depressive insanity, very frequently comes on in the third decade of life. Again, the factor of sex is likewise of little value. In manic-depressive insanity the female sex predominates in the proportion of two to one, while in dementia praecox the preponderance is in favor of the male, but it can be readily seen that this factor is one on which no emphasis can be placed.

Biologic Aspects of Dementia Praecox. Looking at the dementia praecox problem in the light of its relation to its antecedents and environment, F. W. Langdon[8] calls attention to the human hand which, by reason of its adaptability under cerebral influences, has become a highly developed instrument of schooling and precision.

(8) Amer. Jour. Insanity, April, 1917, p. 681.

As such it has, indeed, an acquired modification of structure. Such modifications of "recent acquirement," biologically speaking, are the first to be lost as the result of failures in adaptation.

He called attention to what he terms a "Kraepelinean hand-shake," in which the patient when offered a hand does not grasp it but only stretches his own out stiffly to meet it. He then describes certain peculiarities of the structural character in the hands of dementia praecox subjects described by Stoddart. To this type of hand Stoddart has applied the designation "Simian." He reports forty-four cases in which twenty-one showed typical and fourteen partial simian stigmata. By way of contrast he notes that the simian hand is rarely seen in typical manic-depressives.

The Ductless Glands in Dementia Praecox. It would appear to Francis X. Dercum[9] that in dementia praecox the various glands of internal secretion have suffered in the course of the development of the organism so that their respective functions are subsequently imperfectly and aberrantly performed. It is not at all unlikely that while a number of glands—perhaps the entire chain—are involved in most cases, *e. g.*, the sex glands may dominate the picture; in others again it is the thymus; in still others it is the system of the pituitary, thyroid and adrenals. In favor of the special rôle played by the thymus is perhaps the fact that cases of dementia praecox frequently betray in childhood the forerunners of the affection.

Newer Conceptions of Dementia Praecox Based on Unrecognized Work. After reviewing our present knowledge of dementia praecox, H. I. Gosline[1] reports four cases in which the toxic factor was a large one but was not recognized until autopsy, or until certain special tests were applied; namely, the spinal fluid and blood examinations. He concludes that cases of dementia praecox, of confusional insanity or of delirium, of pseudo-tumor and of various other mental conditions have pathologic conditions which are similar. In the

(9) Archiv. Diagnosis, January, 1917, p. 38.
(1) Jour. Lab. and Clin. Med., July, 1917, p. 691.

four cases which are described, one patient is a syphilitic, one alcoholic, one tuberculous, and one suffered a fulminating attack of influenza.

Studies on Endocrine Organs in Dementia Praecox. From the microscopic examination of two cases M. Kojima[2] concludes that:

The thyroids have an entirely contrary appearance in the male and female; *viz.*, a tendency to hypofunction in the male and to hyperfunction in the female.

The glands on the whole are small, especially in the female.

In the male the parathyroids contain watery, clear cells and a few eosinophile cells, and in the female, on the contrary, many eosinophile cells.

The sexual glands and adrenals were very small in the female.

The diminution of lipoid substance in the cortex cells of adrenals may be due to an acute disease, as stated by Elliott.

Striking changes are seen in the sexual glands—*i. e.*, very slight spermatogenesis in the testes, and an appearance of undergoing an early involution of ovaries.

Results Obtained in Dementia Praecox or So-Called "Endogenous Dementia" by Infusion of Sodium Chloride Solution. In nearly 50 per cent. of all cases treated by infusion of sodium chloride solution, Noboru Ishida[3] observed the wakening of interest in work directly following the treatment. In his opinion the occurrence of fever in some cases after the infusion is not without significance since the mental status of patients with endogenous dementia has often been noticed to have improved after the occurrence of fever.

The Stratigraphical Analysis of Finer Cortex Changes in Certain Normal-Looking Brains in Dementia Praecox. An analysis, chiefly stratigraphical, is presented by E. E. Southard[4] of certain lesions, notably nerve cell loss and gliosis (including satellitosis) in four cases of dementia praecox. These cases were

(2) Proc. Roy. Soc. Med., May, 1917, p. 88.
(3) Amer. Jour. Insanity, January, 1917, p. 541.
(4) Jour. Nerv. and Ment. Dis., February, 1917, p. 97.

in patients who showed no gross aplasia, sclerosis or atrophy in the gross brain and yet exhibited symptoms of two years' or greater duration, entitling them to be considered in the dementia praecox group.

Absence of suprastellate lesions in a case of the paranoic or paraphrenic group was noted, but there was no special evidence of schizophrenia in this case as clinically viewed; the case did show infrastellate lesions in areas continguous with one another in the two flanks of the brain. It might be possible to correlate the late catatonia and late hallucinosis in the case with these infrastellate lesions. Other patients possibly more typical of dementia praecox exhibited lesions both in the suprastellate and infrastellate regions, sometimes numerous, sometimes isolated and apparently capricious in distribution. No good example of lesions chiefly limited to the suprastellate layers has been found.

Gliosis and satellitosis do not follow the nerve cell losses. The same holds true of shrinkage changes and axonal reactions. Nor is satellitosis closely associated either with shrinkage changes (which are not numerous in this series) or with axonal reactions. The dissociation of parenchymatous (neuronic) and interstitial (neuroglia) changes reported in a previous communication is further emphasized.

Manic-Depressive Insanity.

The Makeup of Atypical Cases of Manic-Depressive Insanity. Three cases of atypical manic-depressive insanity are considered by S. N. Clark.[5] All the patients were subject to unusual oscillations of mood which in each individual became so marked that it was necessary to send her to an insane hospital. In the first, the reaction was colored by a slight paranoic tendency; in the second by paranoic and certain hysterical manifestations, and in the third by a paranoic make-up with a dementia-praecox-like mechanism. From the cases here presented, one might infer that

(5) Jour. Nerv. and Ment. Dis., May, 1917, p. 424.

in any type of personality affective oscillations to an extreme degree may occur.

During a marked oscillation of mood, the way in which the individual ordinarily meets situations will stand out with special clearness. This affords us the only reasonable basis for the understanding of the great variety of odd features which are met with in connection with manic-depressive attacks. This has a practical significance. Each of the individuals, the history of whom is reported, was for a time in a state to which even the lay observer applied the term "insane."

Had the author studied and expressed his opinion of any one of the patients before the affective oscillation he might have used such descriptive terms as "queer," "fits of temper," etc., but it is safe to say that he would not have considered the condition as one which was so closely akin to "insanity" as to need treatment. By a study of such cases one may gain a knowledge of the slighter indications of such types of reaction as paranoiac, dementia praecox, etc., which of themselves when exaggerated may lead to the need for institutional care. "There is little hope that education in such cases may be attempted until there is a better understanding, both among the profession and the laity, of the prognosis in the different types of reaction." The writer believes that manic-depressive attacks present certain advantages in the study of these types.

The Manic-Depressive and Dementia Praecox Psychoses: Their Differential Symptomatology. The object of this thesis by H. H. Drysdale[6] is to analyze the symptomatology of these two conditions and to point out in what respects they differ. Among other things he points out that the early life of the individual who becomes afflicted with a manic-depressive disturbance is not infrequently characterized by intellectual alertness. On the other hand, not more than one-third of the patients with dementia praecox prior to the development of the disease have been bright, and many of them have

(6) Amer. Jour. Insanity, April, 1917, p. 627.

exhibited through childhood such abnormalities as violent impulsions, eccentricities, excessive onanism, precocious piety, seclusiveness, puerility of character, grimaces, narrowness of mental outlook, lack of affection, etc.

A manic-depressive psychosis is marked by lucidity and an underlying alternation of exaltation with depression. The attacks of mania and melancholia occurring in dementia praecox are invariably associated with confusion. Furthermore, the typical forms of katatonia are never present in the manic-depressive cases except as fleeting episodes.

Considerable difficulty is encountered in distinguishing between a prolonged period of melancholia and a state of profound confusion. The hypertonia in the former and the atony in the latter may serve as valuable differential signs. Katatonic excitement may be confused with the exalted forms of manic-depressive insanity. The emotional attitude of the manic-depressive is exalted, while that of the katatonic is sullen and indifferent. The movements of the katatonic are not purposive, while those of the manic-depressive are. The early appearance of hallucinations and senseless delusions are indicative of dementia praecox.

Syphilitic Psychoses Associated with Manic-Depressive Symptoms and Course. A number of cases were found by Albert M. Barrett,[7] in which were found mental symptoms which differ much from the usual clinical picture of general paralysis, and seemingly are unrelated to the direct effects of a syphilitic process involving the brain structure.

Clinically the cases of the first group in their symptoms resembled common types of manic-depressive insanity, in which there is no evidence of syphilis. In the majority of these, organic neurologic disturbances were not prominent. In only two cases was memory disturbance at all marked. In but one, a fatal case, was there any general mental deterioration.

The question of combined psychoses has always been interesting in psychiatric discussions. Aside from the

(7) Jour. Amer. Med. Ass'n., Dec. 2, 1916, p. 1639.

structural influence of a syphilitic process of the nervous system in producing disease, there is the possibility of a psychogenic mental disturbance which may develop in the individual who is confronted by the new and distressing problems which come to one who has acquired syphilis. It is not uncommon for functional mental disturbances to occur in the early stages of syphilis, the only explanation for which are the fears consequent upon infection. It is well known that manic-depressive psychoses often have their beginning in a disturbance of the normal moods, brought about by a troublesome situation.

Of the patients, after the serologic examinations had shown the presence of a syphilitic process in the central nervous system, four made improvement in their mental symptoms to a degree that permitted them to return to their homes, and some to take up their business again in an efficient way.

One might conclude that cases of mental disease with the neurologic findings of general paralysis, when the mental symptoms are those of excitement or depression of the manic-depressive type, in a considerable proportion tend to have very complete remissions, and their neurologic symptoms run a mild course.

Undifferentiated Excitement. J. Allen Jackson and Max Abramovitz[8] conclude that excitement, like depression, is common to all forms of mental disease varying in the patient's reaction to stimuli, irritation, etc. Although it is most prevalent in manic-depressive, toxic conditions, infective exhaustive states, agitated melancholia, and dementia praecox, it is not uncommon in constitutional inferiority, epilepsy, senile dementia, paresis, etc.

The authors state:

Before arriving at a definite diagnosis in cases showing excitement, we should abide our time with patience in order that time itself may clear the diagnosis.

We should be especially careful in dealing with patients brought to hospitals by people who can give no information about them, and also with foreigners who

(8) New York Med. Jour., Feb. 3, 1917, p. 211.

can not speak enough English to give the physicians an insight into the patients' ideas.

In cases of excitement with delusions of grandeur with a history of alcoholic excess and presence of physical signs indicative of cerebrospinal syphilis, we should not attempt to classify the excitement immediately. A provisional diagnosis of undifferentiated excitement should be acceptable for the time being. In this way, we will avoid considerable embarrassment which might follow in rendering an early diagnosis of paresis in such cases and which might prove unjust to the patients and relatives.

The authors feel that a tentative diagnosis of undifferentiated excitement seems preferable in obscure cases occurring in early youth, and that time alone will clear up the manic-depressive dementia-praecox problem in these particular cases.

The cases mentioned show the justification of using the classification undifferentiated excitement.

This classification should be acceptable from the hospital executive's standpoint in submitting diagnoses to our state boards of charities, as it conveys a clearer meaning than the use of the terms "unclassified," "allied to," etc.

Senile Dementia.

An Analysis of Fourteen Cases of Senile Dementia Showing Neither Atrophic Nor Arterio-Sclerotic Cerebral Changes at Autopsy. In ten cases of fourteen, reported by L. B. Alford,[9] the clinical pictures correspond fairly well with the symptoms of senile dementia in Kraeplin Psychiatric.

Although no typical arteriosclerotic or senile atrophic changes were found in these brains, it is not necessary to conclude that the mental changes were the result purely or even chiefly of a disturbance of function through nutritional or toxic influences. Rather must one conclude after a study of the findings in the nervous system that in most of the brains organic changes, of a

(9) Jour. Nerv. and Ment. Dis., August, 1917, p. 100.

rather indefinite character perhaps, but nevertheless organic, certainly were present. In seven brains either increase in consistency, or convolutional atrophy or both were noted in the macroscopic examination. In six cases there was noted a chronic leptomeningitis. In each of the seven cases in which the cord was obtainable for study there were found evidences of chronic degeneration corresponding fairly well to the position of the various fiber systems. This last finding seems especially worth of emphasis. Although not necessarily indicating brain disease, the cord findings nevertheless give one the impression that such disease is probably present though in a form not demonstrable by the methods used. The arrangement of fibers in definite systems and the length of individual fibers are characteristics of the spinal cord that render comparatively slight degenerations easy to distinguish, whereas in the brain a similar change would not be evident owing to the intermixing of fibers of different lengths and subserving different functions. It requires no great effort of the imagination to connect the brain with the pyramidal tract degeneration found in one case, but the coexistence of brain changes with the posterior column degeneration found in six cases is less evident. Posterior column degeneration however, is not rare in the aged (Hirsh and others) and has been found in other pure brain lesions, as for instance, tumors. Since another explanation of the degeneration is found in only two cases (arteriosclerosis, meningitis), one must assume general causes; and general causes that affect the cord are quite as likely to affect the brain also.

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